July 2024

Beyond Mobility

Massachusetts 2050 Transportation Plan

Final Plan

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1.0 Introduction

1.1 About this Plan

The Massachusetts Department of Transportation (MassDOT) is required by Federal and State regulation to prepare a statewide long range transportation plan. The Beyond Mobility Statewide Long Range Transportation Plan ("*Beyond Mobility*" or "the Plan") is MassDOT's response to these regulations. However, the Plan goes beyond meeting Federal and State requirements to serve as a strategic plan for MassDOT that thoroughly documents the most pressing transportation issues for MassDOT to address now and in the future to achieve a safer and more equitable, reliable, and resilient transportation system. The priorities and strategies established in *Beyond Mobility* are a reflection of the Healey-Driscoll Administration's vision for enhancing transportation and economic development in Massachusetts.

The title of this Plan, *Beyond Mobility*, refers to the idea that good transportation planning is about more than just moving vehicles for the sake of moving vehicles; it is about connecting people to opportunities and the places they care about and need to go. To that end, *Beyond Mobility* focuses on moving beyond the traditional ways transportation has been evaluated and toward centering people and outcomes at the heart of MassDOT's strategic planning framework.

Land Acknowledgement

MassDOT acknowledges that the land on which our agency operates and on which this Plan was written includes the traditional territories of Mohican, Abenaki, Pocumtuc, Nipmuc, Pennacook, and Wampanoag people. Massachusetts is home to two Federally-recognized tribes—the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Aquinnah—and one state-recognized tribe—the Hassanamisco Nipmuc Band. We deeply respect the special relationship between indigenous people, their physical spaces, and cultural practices, and are grateful for the opportunity to share this place, and this work, with all those who are invested in Massachusetts' future success.

It is important to note that *Beyond Mobility* does not constitute a listing of transportation projects. Rather, this report serves as a policy document that establishes a strategic framework and priorities for MassDOT to address in order to improve the safety, reliability, equity, and sustainability of Massachusetts' transportation system. A series of Problem Statements and responsive Action Items organized by six Priority Areas serve as the backbone of the *Beyond Mobility* plan. Collectively, these items will inform future MassDOT organizational efforts in the areas of policy and program development, research, capital planning and programming, partnerships, and operational improvements, among others, to advance a people-centered transportation system in Massachusetts.

1.2 About MassDOT

MassDOT was created as a unified transportation agency in 2009 as a result of "An Act Modernizing the Transportation Systems of the Commonwealth of Massachusetts." Today, MassDOT is comprised of several modal divisions, including: the Highway Division, which has jurisdiction over

nearly 10,000 roadway miles in the Commonwealth; the Rail and Transit Division, which manages freight, passenger, and seasonal rail lines and coordinates activities with the Commonwealth's 15 Regional Transit Authorities (RTAs); the Registry of Motor Vehicles, which maintains approximately 5.3 million vehicle registrations and licenses for over six million drivers; the Aeronautics Division, which maintains and oversees 35 public use airports; and the Massachusetts Bay Transportation Authority (MBTA), which delivers over 750,000 transit trips per week on bus, subway, Commuter Rail, and ferries. MassDOT also works in partnership with the Massachusetts Port Authority (Massport), which owns and operates Logan Airport—a world class airport that serves as the primary airport of New England and is minutes from downtown Boston—as well as Flynn Cruiseport Boston, the Conley Container Terminal, Worcester Regional Airport, and Hanscom Field.

1.3 Alignment with Other Statewide Planning and Policy

Transportation is interconnected with a number of policy areas, including climate action, public health, economic development, housing production, and smart growth, among others. As such, the content included within *Beyond Mobility* is consistent with other statewide planning and policy reports. Specifically, the following reports were critical to the development of *Beyond Mobility*, which builds on rather than supplants their transportation-related elements:

- *MassDOT Resiliency Improvement Plan*, MassDOT Highway Division (2024).
- *Recommendations of the Climate Chief,* Massachusetts Office of Climate Innovation and Resilience (2023).
- *ResilientMass / State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)* (2023).
- *Comprehensive Economic Development Plan,* Massachusetts Executive Office of Housing and Livable Communities (EOHLC) (2023).
- The MBTA's most recent *Capital Needs Assessment and Inventory* (CNAI) (2023).
- The *2023 MBTA Strategic Plan.*
- *Massachusetts Clean Energy and Climate Plan for 2025 and 2030*, Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) (2022).
- Prior MassDOT modal plans including the *Freight Plan* (2023), the *Bicycle Plan* and *Pedestrian Plan* (2019), the *Bicycle and Pedestrian Update* (2021), and the *State Rail Plan* (2018).
- Prior MassDOT policy reports including *Congestion in the Commonwealth* (2019) and the *Report of the Commission on the Future of Transportation in the Commonwealth* (2018).
- Safety plans and programs including the Highway Safety Improvement Program (HSIP), *Strategic Highway Safety Plan* (SHSP), and Public Transportation Agency Safety Plans.

In the same vein as previous plans impacting the development of *Beyond Mobility*, it is envisioned that future related planning efforts at MassDOT and the MBTA will be consistent with and directly informed by *Beyond Mobility*. These future planning efforts include but are not limited to the *Program for Mass Transportation* (PMT), which represents a 25-year plan for how the MBTA can meet the needs of the region; future modal plans; corridor studies; capital plans; and other related strategic planning efforts. Additionally, at the time of the development of *Beyond Mobility*, the Healy-Driscoll Administration announced the creation of a new Transportation Funding Task Force. It is anticipated that *Beyond Mobility* will serve as an important foundation for the work of this Task Force through providing a definition of the vision for the future of transportation directly informed by public input.

In addition to these statewide planning efforts, it is critical to note the important role that municipalities in Massachusetts play in advancing an improved transportation future. In line with the spirit of the Healey-Driscoll Administration's Federal Funds Partnership for Municipalities, MassDOT is committed to ensuring there are open lines of communication between state, Federal, and municipal governments to ensure linkages between strategies like those set forth in *Beyond Mobility* and other statewide planning efforts and the implementation of projects on the ground.

1.4 Plan Structure

This introduction constitutes Chapter 1 of the *Beyond Mobility* plan. Chapter 2, "Strategy and Approach," describes at a high level several tasks that were performed for this Plan, including public outreach, a needs assessment, a review of prior plans, scenario planning, and performance-based planning.

Chapters 4 through 6 are structured by the following six Priority Areas, which were developed through extensive data analysis and robust public engagement. These Priority Areas are inclusive of the themes that emerged from these activities.

1. **Safety** refers to the ability of travelers to move through the transportation system free of physical or other harms.

2. **Reliability** refers to the consistency of transportation network conditions and predictability of travel times across all transportation modes.

3. **Supporting Clean Transportation** refers to the transportation network's ability to accommodate carbon-free travel modes.

4. **Destination Connectivity** refers to the degree to which travelers of any mode can access opportunities and the places they need or want to go.

5. **Resiliency** refers to the ability of the transportation network to anticipate, prepare for, and withstand the ongoing impacts of climate change.

6. **Travel Experience** refers to conditions faced by travelers throughout the transportation network, including level of comfort and state of good repair.

Given the Plan's focus on public engagement, Chapter 3, "What We Heard," provides a detailed summary of all public engagement feedback received by Priority Area.

Chapter 4, “Priority Areas,” documents vision, values, and problem statements for each Priority Area. Although *Beyond Mobility’s* planning horizon is 2050, the Plan’s focus on problem statements stems from the notion that the actions MassDOT needs to take right now to achieve the vision for the future must be directly responsive to actual challenges that people face when using Massachusetts’ transportation system.

Chapter 5, “Action Items,” identifies and describes the actions that MassDOT Divisions and the MBTA will take to address transportation problems and make progress toward achieving the vision statements established in Chapter 4. An online Action Items Progress Report has also been developed to assist track progress on all of the Beyond Mobility Action Items.

Chapter 6, “Performance-Based Planning,” establishes specific performance metrics to track transportation system outcomes in line with the *Beyond Mobility* Priority Areas and Action Items.

Chapter 7, “Funding the Transportation System,” provides analyses and descriptions of revenues for transportation from a variety of different sources Massachusetts is anticipated to receive between now and the Plan’s horizon year of 2050.

The following appendices are also included and contain additional detail:

- Appendix A—Public Engagement Results
- Appendix B—Previous Plan Review
- Appendix C—Needs Assessment
- Appendix D—System Performance Report
- Appendix E—Draft Report Comments and Responses
- Appendix F—MassDOT Resilience Improvement Plan (RIP)

1.5 Statement on Mode Shift and Vehicle Miles Traveled (VMT) Reduction Targets

During the comment period for *Beyond Mobility*, a number of comments were received on the topic of facilitating mode shift away from single occupancy vehicles and toward transit and active transportation modes. In addition to the responses that have been provided to these comments in Appendix E, this section has been added to the final version of the Beyond Mobility plan to reflect MassDOT’s disposition on this topic.

MassDOT believes in the criticality of mode shift with respect to meeting a host of goals not only for the quality and reliability of the transportation network, but for meeting the state’s environmental and sustainability goals as well. Mode shift helps reduce vehicle miles travelled (VMT), which is otherwise primarily driven by a reduction in overall trip-making. MassDOT’s commitment to encouraging mode shift is demonstrated throughout the Beyond Mobility plan and referred to in several Vision and Values statements that define our six priority areas. Additionally, several Action

Items defined under various priority areas encourage investment in and expansion of non-vehicular travel services and infrastructure, with the ultimate goal of promoting use of non-vehicular travel modes.

As the document establishing the strategic vision, values, and activities that MassDOT will undertake, those policies and processes that execute Beyond Mobility's directives will also be updated. These include MassDOT's framework for performance evaluation and target-setting, which is an ongoing and iterative process that culminates with the publication of the yearly MassDOT Tracker report. Chapter 6, Performance-Based Planning, introduces a number of measures that could be implemented to quantify progress on various transportation system outcomes.

MassDOT works closely with other Secretariats in meeting performance targets set for the state, including the statutory statewide greenhouse gas (GHG) emissions limits set by the Executive Office of Energy and Environmental Affairs. MassDOT and EEA continue to review the VMT targets modeled for the Clean Energy and Climate Plans (CECPs) and partner on initiatives intended to promote transit ridership and reduce single-occupancy trips. MassDOT is also partnering with EEA on development of the holistic land use plan, referenced in the 2050 CECP, to more strategically link transportation and other land-use policies.

2.0 Strategy and Approach

2.1 Overview

The *Beyond Mobility* planning process was designed to not only meet all Federal and state requirements for long range transportation planning, but also to use extensive public engagement, data analysis, scenario planning, and other activities to thoroughly understand Massachusetts' most pressing transportation challenges and priorities for MassDOT to address.

Figure 2.1 illustrates the organization of the planning process into two distinct phases. The first phase focused on documenting the key transportation problems and defining a shared vision and set of values for long-term transportation decision-making, while the second developed an action plan for directly responding to these challenges to achieve the vision for transportation across the Commonwealth.

Figure 2.1 Beyond Mobility Planning Process

The six key tasks that informed this planning process are summarized in Chapter 2:

- **Public Outreach**: Extensive outreach targeting disadvantaged communities and using a variety of public engagement techniques yielded over 5,000 pieces of unique feedback focused on defining key problems, priorities, and visions for the future of transportation.
- **Needs Assessment**: To complement the public engagement data described above, a Needs Assessment involving quantitative analysis was performed to define key challenges and disparities in transportation outcomes across communities.
- **Defining Priority Areas**: The public feedback and needs assessment findings were synthesized into six Priority Areas (described in more detail above and in Chapter 4) that encompass the comprehensive set of transportation needs to be addressed in the future. Each Priority Area includes a vision statement, values statements, and problem statements based on the *Beyond Mobility* public outreach and needs assessment findings.
- **Developing Action Items**: Specific actions for MassDOT's Divisions and the MBTA in the areas of policy and programming, research, partnerships, capital planning, and operational

improvements were developed in direct response to the vision statements and problems identified in previous stages. These Action Items are described in detail in Chapter 5.

- **Scenario Planning**: Recognizing that the future is uncertain and that a number of trends impact the future of transportation, scenarios were developed and used as a filter against the identified Action Items to understand which actions may be more pressing under different scenarios.

- **Performance-Based Planning**: To track progress towards desired outcomes defined under each Priority Area, a series of performance measures were developed and other performance measures recommended for future development (more detail in Chapter 6).

2.2 Public Outreach

Public engagement was a cornerstone of the *Beyond Mobility* planning process. The engagement strategy was designed to inform the direction of *Beyond Mobility*, including both the problem statements and the vision and values statements. The approach was adjusted throughout the process to ensure that representatives of all communities and demographic groups could participate throughout the development of the Plan.

Overall, the public engagement process included a range of outreach and feedback efforts, including 3,650 responses to two public surveys; six multilingual and multicultural focus groups and interviews; one virtual public meeting; nine Meeting-in-a-Box interactions with community stakeholders; and numerous stakeholder interviews throughout the development of *Beyond Mobility*. Collectively, this process resulted in over 5,000 pieces of feedback about people's visions for the future of transportation as well as current challenges.

The public engagement activities were focused on key topics designed to inform and guide the plan development (Figure 2.2).

Figure 2.2 Beyond Mobility Engagement Phases & Purpose

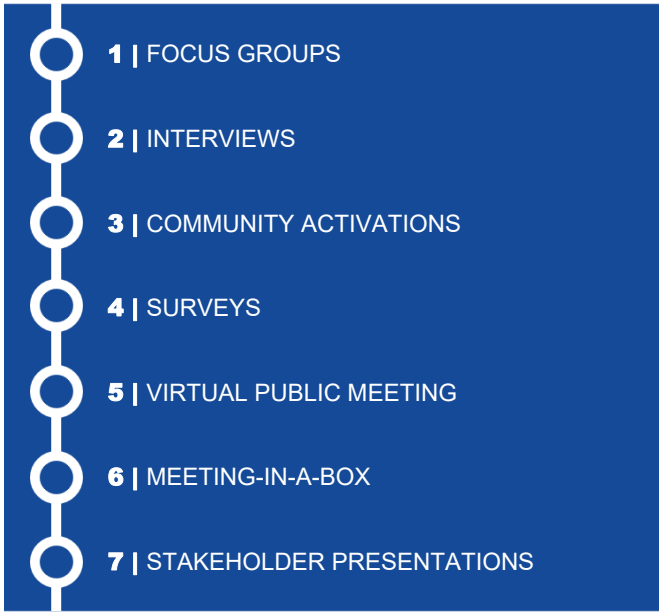
PHASE 1:
Visioning & Needs
Informed the understanding of problems and vision for future transportation
PHASE 2:
Tradeoffs Assessment
Guided the development of problem statements
PHASE 3:
Feedback on Draft Plan Items
Refined draft plan to ensure Beyond Mobility meets the Commonwealth's transportation vision

The **first phase** of engagement was designed to understand existing challenges and define a vision of improved transportation outcomes.

The **second phase** focused on assessing tradeoffs across a variety of different funding programs to understand the priorities of different demographic groups and geographic areas. The second phase

also focused on targeted outreach to Environmental Justice[1] communities and others who are often affected by transportation policies, but left out of decision-making processes. Previous public comments collected through prior planning processes were also used to guide the development of *Beyond Mobility*.

The goal of the **third phase** of engagement for *Beyond Mobility* was to gather feedback on draft plan content, and included targeted stakeholder meetings with a wide range of diverse groups. This phase of engagement included presentations to community and environmental advocacy groups focused on a variety of issues, including pedestrian and cyclist infrastructure, accessible infrastructure, public transportation, housing, and environmental justice, among others. Specific perspectives were sought from freight transportation stakeholders; business groups and chambers of commerce; municipal staff; private providers of transportation; tribal organizations; and others.



This outreach was performed not only to satisfy Federal regulations set for statewide long range transportation planning processes, but also to ensure that the Plan and its recommended Action Items accurately reflected all user perspectives and experiences, particularly those historically excluded from planning processes.

Engagement Strategies

Beyond Mobility's robust public engagement approach was designed to make participation easy through quick interactions and conversations. Table 2.1 shows the engagement techniques and results that informed each phase of plan development. Appendix A documents the Public Engagement Plan and inventories of the detailed engagement results for each phase and technique, while Chapter 3 summarizes public engagement findings.

[1] The *Beyond Mobility* Environmental Justice community designation is distinct from the traditional Environmental Justice definition in that it incorporates data on vehicle access, disability status, and age in addition to income, race, and limited English proficiency and it compares each Census block group's characteristics for each variable to the average of its Metropolitan Planning Organization (MPO) region rather than statewide averages.

Table 2.1 Engagement Techniques and Results

Phase	Technique	Results & Key Facts
Phase I	Survey—Vision, Values, & Needs	○ The online survey received 1,107 survey responses and was available in Chinese, French, Haitian Creole, Portuguese, Spanish, Vietnamese, and English. ○ Of the respondents, 11 percent were people of color and 13 percent were people aged 65 and older. ○ The median household income of survey respondents was approximately $100,000.
	Interviews—Vision, Values, & Needs	○ Six one-on-one interviews were conducted with Mandarin- and Vietnamese-speaking participants.
	Focus Groups—Vision, Values, & Needs	○ Four focus groups were conducted with Spanish-speaking, Portuguese-speaking, Haitian Creole-speaking, and English-speaking Black community Massachusetts residents.
Phase II	Survey—Priorities & Tradeoffs	○ The second online survey received 2,500 survey responses. ○ The survey reached more people of color (29.5 percent), limited English proficient (12 percent), and low-income respondents (12 percent) than the first. ○ The median income of Phase II respondents was approximately $83,000, slightl ○ Fewer older and rural respondents were captured in Phase II, while more limited English proficient people participated. ○ Eighty-eight percent of Phase II respondents used English to complete the survey compared to 99.5 percent of Phase I.
	Community Activations—Priorities & Tradeoffs	○ Community Activations were undertaken in 11 communities: Roxbury, Lynn, Mattapan, Lowell, Lawrence, New Bedford, Brockton, Worcester, Springfield, Framingham, and Pittsfield. ○ These events were located in some of the largest concentrations of Massachusetts' underserved communities, were situated in a heavily trafficked area during a busy time, and were strategically located to interact with users of multiple modes of transportation.

Phase	Technique	Results & Key Facts

	Meeting-in-a-Box—Priorities & Tradeoffs	○ MassDOT provided Meeting-in-a-Box kits to community groups interested in hosting *Beyond Mobility* workshops and gathering feedback from their members.
		  ○ Meeting-in-a-Box is an emerging public engagement technique that helps promote the project, inform residents, and encourage group conversations about a specific plan, project, or initiative.
		○ Ten community groups* participated in the plan development using Meeting-in-a-Box kits:
		  ○ Berkshire MPO & Transportation Advisory Committee
		  ○ Amherst Transportation Committee
		  ○ Western Mass Transit Advocacy Network
		  ○ Greater Worcester Community Foundation
		  ○ Outer Cape Focus Group
		  ○ Southeastern Regional Planning & Economic Development District Focus Group
		  ○ Worcester Community Action Council
		  ○ Worcester Center for Independent Living & Working
		  ○ Health Equity Partnership of North Central Massachusetts (CHNA9)
		  ○ Berkshire Regional Coordinating Council on Transportation

	Virtual Public Meeting—*Beyond Mobility* Project Overview	○ A virtual public meeting with 54 participants was held to provide an overview of the *Beyond Mobility* planning process and capture input on people's visions and needs for the future.
Phase III	Targeted Outreach	MassDOT conducted outreach meetings with the following groups: ○ Freight Advisory Council ○ Greater Boston Chamber of Commerce, MA Policy Network ○ Intercity Bus Carriers ○ Western MA Transportation Advocacy Network ○ Massport ○ League of Women Voters Massachusetts ○ Great Neighborhoods Network ○ Mass Municipal Association, Committee on Public Works ○ Herring Pond Wampanoag Tribe** ○ WalkMassachusetts Network
All Phases	Earned Media	○ Several *Beyond Mobility* features on local radio stations, blogs, websites and newspapers.
	Paid Media	○ 24 paid media ads through ethnic media channels using print advertising, online advertising, social media, and radio channels.
	Website	○ Regular website updates with project factsheets and findings.
	Email	○ Eight *Beyond Mobility* emails sent to a project interest list totaling over 1,500 unique email addresses.
	Stakeholder Meetings	○ Over 20 one-on-one in-depth interviews with stakeholders representing people with disabilities, economic development entities, representatives of transportation users, workforce development groups, public health community, environment organizations, Metropolitan Planning Organizations, and others.

*The groups that participated in the meeting-in-a-box activities were those that responded to MassDOT requests. Although not all Metropolitan Planning Organizations (MPOs) participated, presentations on Beyond Mobility were made to all thirteen MPO regions in Massachusetts at various points of Plan development to ensure they were engaged in the Plan's development process.

** Massachusetts' two Federally-recognized tribes (the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Aquinnah) and Massachusetts' one state-recognized tribe (the Hassanamisco Nipmuc Band) were contacted during the development of Beyond Mobility, but did not respond to requests to participate.

2.3 Needs Assessment

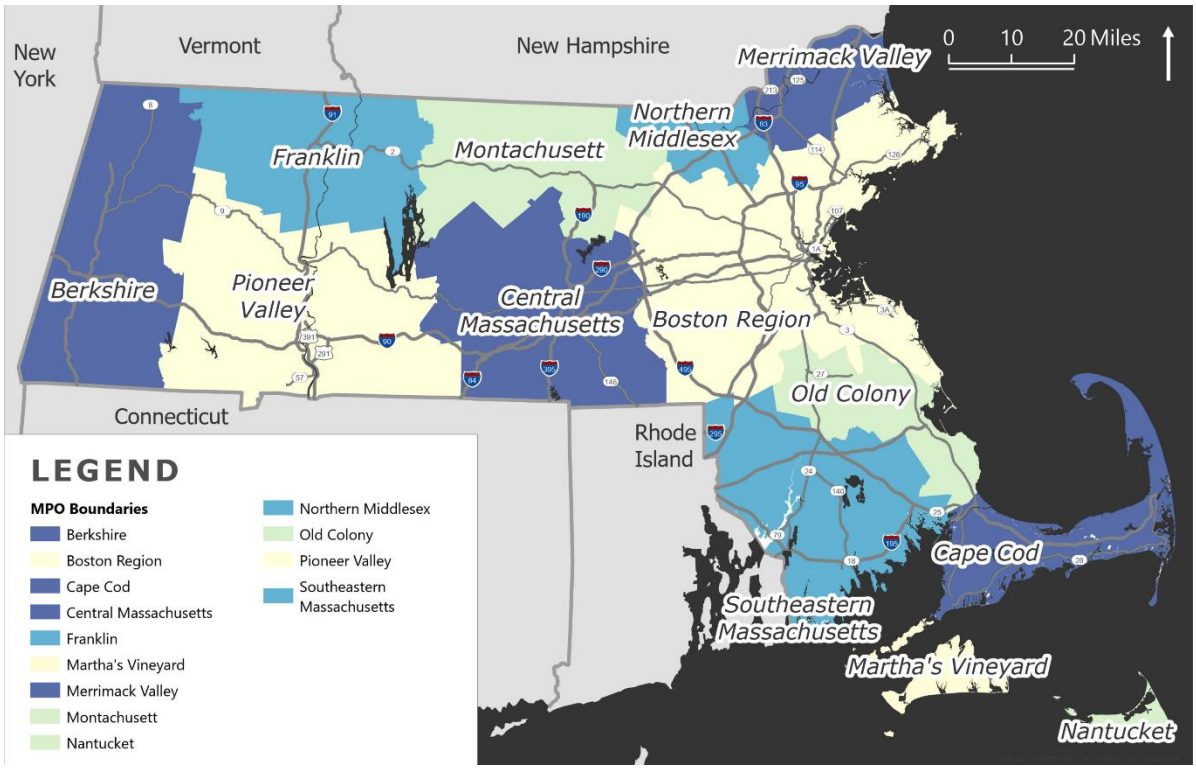
While public outreach and engagement efforts collected information about the lived experience of residents when using the transportation network and the related values and priorities that are important to maintain, the project team conducted a statewide Needs Assessment to identify infrastructure and land use barriers to transportation access and major problem areas across the Commonwealth. The assessment involved the following three steps:

- Define the transportation system.
- Compile barriers and recommendations from prior planning studies.
- Analyze additional data to develop Problem Statements and identify locations that may be driving problem areas.

Defining the System

The Needs Assessment first identified elements of the transportation system for evaluation that impact service; congestion; safety; asset condition; and accessibility to jobs, retail, open space, health care, and other destinations. Geographic boundaries were included in the base condition map, including Metropolitan Planning Organization (MPO) regions, municipalities, and urban boundaries. Figure 2.3 shows the MPO boundaries for Massachusetts.

Figure 2.3 MPO Boundaries



Leveraging Previous Planning & Public Engagement

The Needs Assessment leveraged existing MassDOT data and information, including an evaluation of existing MassDOT modal and service plans. Over 300 transportation barriers were identified through previous planning studies; a more detailed discussion of the previous plan inventory is provided in Appendix B. Transportation barriers varied by geography (statewide, region, or municipality) and theme (safety, roadways, public transportation, active transportation, airport, or goods movement).

Each of these barriers was mapped to understand the key themes across geographies and themes of the reviewed plans and policies, examples of which are shown in Table 2.2.

Table 2.2 Examples of Transportation Barrier Themes from Previous Planning Efforts

Barriers	Examples
Community Characteristics and Trends[1]	Shared transportation is expanding unevenly across Boston's residential neighborhoods—*GoBoston 2030* Massachusetts is an expensive place to live, and too often, the burden of those high expenses falls on lower-income residents and communities of color—*Reimagining the Future of Massachusetts*
Transit Reliability	Roadway congestion is increasingly hampering the performance and efficiency of transit services, especially buses—*Congestion in the Commonwealth* Routes with on time performance (OTP) below 80% may lead to more systemic issues and negative customer perceptions—*2020 Comprehensive Regional Transit Plan (CRTP)—WRTA*
Environmental	Fully diesel service leads to longer travel times and local air quality issues—*MBTA Focus40* Climate change impacts are expected to raise the risk of damage to transportation systems, energy-related facilities, communication systems, a range of structures and buildings, solid and hazardous waste facilities, and water supply and wastewater management systems—*Massachusetts State Hazard Mitigation and Climate Adaptation Plan*
Roadway Congestion and Reliability	Between 2013 and 2018, peak period travel times have grown on most roadway segments, with the most significant increases in Boston Metro—*Congestion in the Commonwealth* Reoccurring bottlenecks and physical constraints continue to negatively impact freight movement on the regional highway network—*Old Colony 2020 LRTP*

[1] *This theme encompasses several specific categories that attempt to highlight inequities in the transportation system. Aging population, funding, transportation equity, historical context, and related barriers fall into this category.*

The data revealed community characteristics and trends, such as inequities, wage and skills gaps, low transit reliability, and the high cost of living in Massachusetts. The word "income" appeared 15 times within the barriers, while the word "cost" appeared 13 times and the word "gap" appeared 10 times. The inventory demonstrated that public transportation is not accessible physically or financially in an equitable way across the Commonwealth, directly tying into transit as the next most common barrier with a lack of reliability, direct connections, and barriers to access transit.

Environmental concerns and roadway congestion, reliability, and safety were also highlighted as top concerns and priorities for future investments. This exercise informed the data analysis described below and was critical for developing the *Beyond Mobility* Problem Statements, which formed the foundation for the Plan's Action Items.

The results of the *Beyond Mobility* Phase I Vision, Values, & Needs Survey were also used to pinpoint specific themes or locations to be further investigated. This public survey asked participants to highlight up to three locations throughout the Commonwealth where transportation improvements are needed. Corresponding with the previous analyses, nearly 1,000 specific transportation barrier locations were identified and analyzed for key themes to support the understanding of various needs from the perspective of transportation system users.

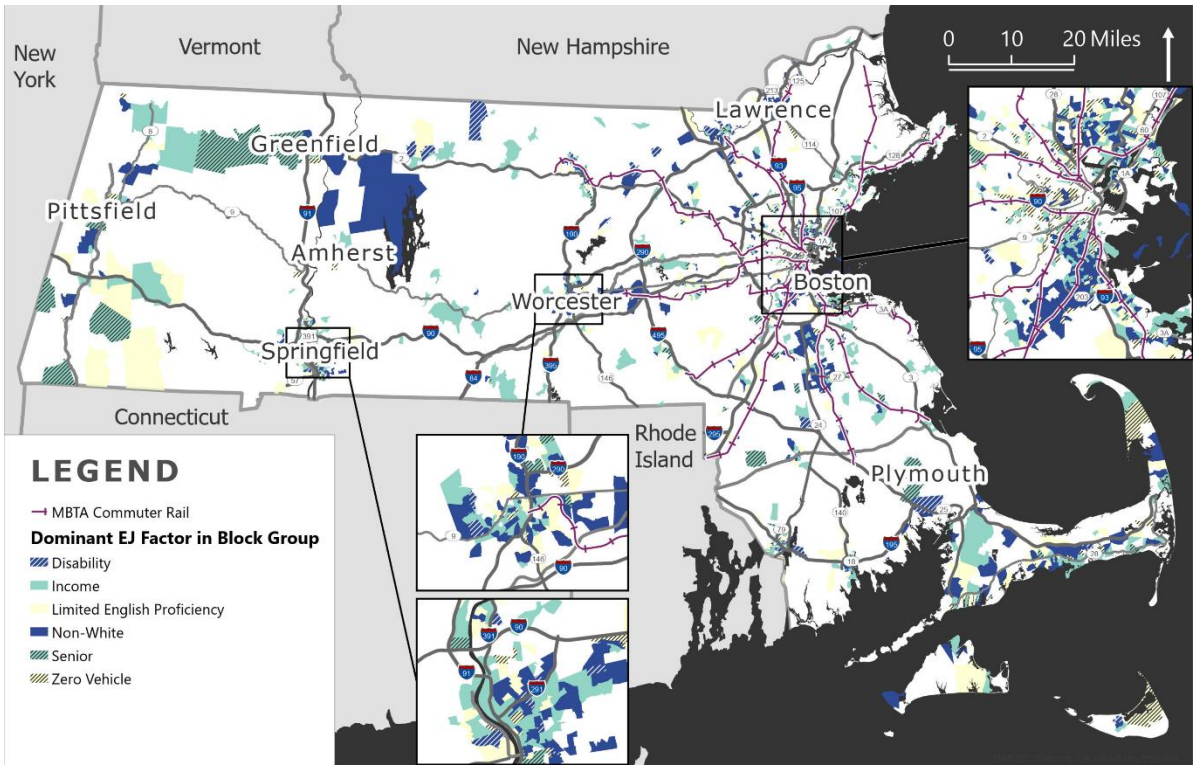
Defining Equity Areas of Focus

MassDOT was intentional about prioritizing the needs of Massachusetts' Environmental Justice communities in *Beyond Mobility*. Through policies, practices, programs, and budgets, MassDOT has an opportunity to advance equitable access to safe, efficient, and affordable transportation systems across the Commonwealth.

Historically, transportation investment decisions have perpetuated inequities in communities such as Black, Latino, Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas or urban cores; and persons otherwise adversely affected by persistent poverty or inequality. Entrenched disparities have been embedded in the design of transportation planning and investment decision-making processes over time and *Beyond Mobility* is envisioning a variety of approaches to move towards transportation justice.

Figure 2.4 shows the most dominant equity factor by region for Environmental Justice areas identified around the Commonwealth.

Figure 2.4 Environmental Justice Communities, Most Dominant Equity Factor by Region



To define equity areas of focus so that data analyzed as part of the Needs Assessment could be compared across demographic groups to perform "equity checks," *Beyond Mobility* used demographic data to identify areas with high concentrations of communities that experience disproportionate burdens resulting from the impacts of the transportation system. While referenced as "Environmental Justice communities" throughout *Beyond Mobility*, the specific definition of these equity areas of focus is derived from MassDOT's Regional Environmental Justice "Plus" (REJ+) data layer, which represents a holistic understanding of communities that are most impacted by transportation planning and decision-making. The *Beyond Mobility* Environmental Justice community designation is distinct from the traditional Environmental Justice definition in that it incorporates data on vehicle access, disability status, and age, in addition to income, race, and limited English proficiency status.

In addition to providing a more holistic and transportation-specific definition of equity, the Environmental Justice communities definition referred to in *Beyond Mobility* compares each Census block group's characteristics for each demographic variable to the average of its MPO region, rather than statewide averages. This allows the designation of an Environmental Justice community to be contextualized, accounting for the wide variation in demographic characteristics seen throughout the state. For a community to be designated as an Environmental Justice community, it must have a higher concentration of these criteria than other communities within its MPO region. For a more detailed explanation of the REJ+ methodology and explanation of how communities are designated, please visit MassDOT's TIS/REJ+ Dashboard.

To be defined as an Environmental Justice community, a geographic area must meet one of the following criteria, which are based on the definitions used by the Executive Office of Energy and Environmental Affairs:

- Higher concentration of poverty than in nearby communities,
- Higher concentration of non-white households than in nearby communities, and/or
- Higher concentration of people with limited English proficiency than in nearby communities.

To extend this definition and consider additional demographic characteristics that also influence accessibility and mobility, the following variables were also factored into the Environmental Justice community definition to identify which demographic variable(s) most "drive" transportation vulnerability:

- Higher concentration of households without access to a vehicle than nearby communities,
- Higher concentration of people with disabilities than in nearby communities, and
- Higher concentration of people aged 65 years and over than in nearby communities.

Defining Key Facts and Problem Statements

Key needs assessment data (see inset, right) were analyzed and screened against Environmental Justice community boundaries, urban boundaries, and their proximity to transit stations. This screening allowed the project team to define 'key facts' that demonstrate the overall needs of the Commonwealth and take special note of how these needs are experienced differently by historically marginalized communities. Alongside public engagement findings, these 'key facts' define the Problem Statements, which were used as the foundation for the Plan's Action Items.

For example, recent crash data indicates that Environmental Justice communities have 1.7 times more pedestrian crashes per capita and 1.3 times more fatal and serious crashes per capita than non-Environmental Justice communities. Additionally, Environmental Justice communities have 18.4 times more roadway miles at high risk for pedestrian crashes and 13.7 times more roadway miles at high risk for bicycle crashes than non-Environmental Justice communities. Based on this information, the following Problem Statement was developed:

Environmental Justice (EJ) Communities—areas with larger populations of low income, limited English proficiency, and/or residents of color—are disproportionately burdened by transportation-related injuries and deaths on roadways, particularly those involving pedestrians and people on bicycles.

Developing the problem statements involved a comprehensive review of data from the Needs Assessment that identified focus areas (geographies, corridors, etc.) of highest needs within each MPO region. The *2024-2028 Capital Investment Plan* (CIP) was overlaid with the analysis above to determine where overlapping needs and gaps in investments exist.

Example Key Needs Assessment Data Analyzed

Safety

- Fatal and Serious Crashes
- Roadway Risk
- Pedestrian Crash Clusters
- Bicycle Crash Clusters

Destination Connectivity

- Potential for Walkable Trips
- Potential for Bicycle Trips
- Bicycle Facility and Share Coverage
- Sidewalk Gaps

Travel Experience

- Pavement Condition
- Bridge Condition
- Curb Ramps

Resiliency

- Sea Level Rise
- Hurricane Inundation Zones

Reliability

- Planning Time Index

2.4 Defining Priority Areas, including Vision and Values

The extensive public feedback and needs assessment data were used to directly inform *Beyond Mobility's* six Priority Areas. These Priority Areas are the key themes by which the public, our stakeholders, and our subject matter experts understand MassDOT's role in developing and maintaining a strong statewide transportation network. The definition of the Priority Areas represented a critical point in *Beyond Mobility*'s progress, because these Priority Areas organize the work MassDOT both does now and will do into the future.

Each *Beyond Mobility* Priority Area includes a vision statement, a series of values statements, and one or more Problem Statements (which are themselves defined by key facts). Like the Priority Areas and Problem Statements, the vision and values statements were informed and guided by public input and feedback.

Each Priority Area's vision statement looks ahead to 2050 and describes an ideal future transportation system with respect to that Priority Area, based directly on feedback received from Massachusetts residents, stakeholders, MassDOT staff, and subject matter experts. Vision statements describe our collectively sourced desires for the future of our state's transportation network as they relate to various elements.

The values statements are the principles that MassDOT will uphold when identifying strategies to achieve the vision of each Priority Area. Values statements describe what MassDOT stands for and the standards by which the agency's work is done. The Priority Areas, described in more detail in Chapter 4, include:

- **Safety**: The ability of travelers to move throughout the transportation system free of physical or other harm.
- **Reliability**: The consistency of transportation network conditions and predictability of travel times across all transportation modes.
- **Supporting Clean Transportation**: The transportation network's ability to accommodate low-emission and carbon-free travel modes.
- **Destination Connectivity**: The degree to which travelers of any mode can access opportunities and the places they need or want to go.
- **Resiliency**: The ability of the transportation network to anticipate, prepare for, and withstand the ongoing impacts of climate change.
- **Travel Experience**: The conditions faced by travelers throughout the transportation network, including level of comfort and state of good repair.

2.5 Developing Action Items

The *Beyond Mobility* Action Items (detailed in Chapter 5) articulate the actions that MassDOT and the MBTA will take in response to the vision, values, and Problem Statements identified within each Priority Area. These Action Items account for ongoing initiatives and programs that MassDOT and the MBTA are already involved in and also propose new complementary strategies. Developing these Action Items was a crucial component of *Beyond Mobility* because they define how MassDOT will address identified problems and establish the lead parties responsible for Action Item execution and implementation.

Action Items were identified and confirmed through an iterative process. Actions in previous planning documents provided a solid foundation, and public input confirmed or updated those priorities. Stakeholder interviews—both internal and external to MassDOT—were conducted to further understand problem areas and potential actions. These action items were reviewed by subject matter experts and refined by MassDOT staff through internal workshops and multiple rounds of individual reviews.

The Plan's Action Items are assigned to the following categories:

- **Policy and programming efforts**: The formulation of new policies and/or funding programs that address identified problems.
- **Research**: The development of scopes of work and/or problem statements in response to the problem statements, serving as a "Research Roadmap" for MassDOT and its partner agencies.
- **Partnerships**: Coordination with local, regional, and Federal partners to advance new initiatives and ideas.
- **Capital planning efforts**: Changes to MassDOT and MBTA capital plan program sizes and/or processes that direct funding within each program.
- **Operational improvements**: Changes to the operations of transportation services that would address identified problems.

In addition to including one of the categories referenced above, each Action Item has been assigned one or more agency and/or MassDOT Division responsible for implementation, the status of the Action Item (new or ongoing), the timeframe required for the Action Item's completion (either short term, defined as taking place within next five to 10 years, or mid term, within the next decade and beyond), and additional relevant notes. An Action Item webpage in *Tracker*, MassDOT's performance management dashboard, complements this component of the Plan and will be used to track the progress toward implementing each Action Item.

2.6 Scenario Planning

Scenario planning brings awareness of uncertainty and risk into decision-making. In order to ensure that the Action Items recommended in this Plan are able to satisfy a range of possible future challenges and opportunities, MassDOT identified variables that will influence the future transportation system through a series of collaborative workshops with subject matter experts. The variables were grouped into six overarching trends, provided in Table 2.3.

Table 2.3 Trends and Variables Developed for *Beyond Mobility*

Trend	Variable
Climate Change	Sea Level Rise
	Extreme Temperatures and Energy Needs
	Severe Weather
Future-of-Work	Flexible Work Schedules
	Labor Shortage
	Telepresence
People	Aging Population
	Household Size
	Migration to Massachusetts
Places	Housing
	Workplaces
Prosperity	Cost of Transportation
	Income Inequality
	Knowledge Economy
	Racial Wealth Gap
Technology	Automation
	E-commerce
	Electricity and Alternative Energy
	Freight
	New Mobility
	Cost of Transportation

MassDOT conducted research into the recent history and potential future of each of these variables and produced summary fact sheets for each trend. In each case, MassDOT charted the recent course for the trend and how that change could accelerate, maintain, or plateau/reverse between today and 2050.

MassDOT developed three scenarios for the state's transportation network in 2050. In this exploratory process, elements of these future outcomes that could be perceived as both "desirable" and "not desirable" are considered as a whole. Scenarios were used to test Action Items (described in Chapter 5) to ensure *Beyond Mobility's* recommendations and strategies were robust across a wide range of potential futures.

Future Scenarios

The future scenarios developed for *Beyond Mobility* consider the possible acceleration, continuation, or reversal of present-day trends. These scenarios are:

Hybrid and Diverse, in which all recent trends **accelerate**, is named after hybrid work and telepresence. In this scenario, these would be defining facets of many Bay Staters' lives, and a younger, more diverse 2050 Massachusetts population. For example, under this scenario, as work-from-home spreads the population across the Commonwealth, the growth in housing prices and resulting displacement are likely to be significantly greater in those areas farther from Boston. In this scenario, the biotechnology industry has grown substantially, and it is not uncommon to see laboratory facilities centered in mixed-use "villages" in inland areas of the Commonwealth. The lack of demand for in-office work could create a feedback loop, as employers would bear the costs of office space for a single day per week per employee, and as a consequence, co-working spaces would be the only viable conventional offices that remain.

Office buildings in many areas would be replaced by a limited number of residential units. As work-from-home has spread demand across the Commonwealth, housing prices would soar everywhere, and displacement would arise as a concern to areas farther from Boston.

Summers would become hotter (26 more days per year over 90 degrees) and the whole year would become wetter (13 percent more precipitation in total, and over 20 percent in the winter as rain).

Ahead as Before, in which all recent trends are **maintained**. Under this scenario, hybrid work models would proliferate in industries where this is possible. As Baby Boomers leave the workforce, they are replaced by smaller trailing generations, leading to persistent labor shortages and inflation as higher wages filter down to consumer prices. Successively smaller generations also would not be able to support the Commonwealth's current large number of colleges, and thus some of the smaller schools would close, hurting access to higher education in some disadvantaged communities.

Massachusetts's knowledge economy would maintain its strength in biotechnology, but would plateau in other high-tech sectors as employers can no longer justify the high cost of living in Boston relative to competing metropolitan areas. Much of the area's conventional office square footage would be converted to or replaced by research labs and distribution centers for e-commerce. Housing prices continue to be high but do not experience exponential growth, as communities build a moderate number of new residences.

Active transportation would become plausible for longer periods since less of the winter would be severely cold (30 fewer days under 32 degrees), though winter precipitation would increase in the form of rain or freezing rain (15 percent more winter precipitation than in 2022).

Close and Connected, in which all recent trends **plateau/reverse**. Under this scenario, a combination of corporate pressure and the desire to maintain a work-life balance would bring workers back to the traditional office. Housing costs would plateau across the Commonwealth as a divided economy (knowledge inside Interstate 495, industrial outside) spreads out the demand for housing. Nonetheless, historically marginalized residents would effectively be priced outside of Route 128, becoming dependent on an under-supported Commuter Rail network to reach service jobs in the inner core.

Automation would support but not supplant blue-collar employment, and the manufacturing industry would grow in Central, Western, and Southeastern Massachusetts through on-shoring and 3D printing. The knowledge economy would plateau and consolidate in Boston, Cambridge, and Somerville. As non-biotech, high-tech companies would also seek space close to these institutions, job density in Kendall Square, the Seaport, and Longwood would continue to grow, taxing the transit system in those locations past their limits.

Global warming would peak around 2050 with seven more days over 90 degrees, 19 fewer days below 32 degrees, and only slightly more precipitation as compared to 2022.

2.7 Performance-Based Planning

MassDOT must track the performance of *Beyond Mobility's* implementation, as well as broader outcomes of the transportation system. Chapter 6, the Performance-Based Planning chapter, is organized by Priority Area and identified indicators informed by the *Beyond Mobility* planning process that will be used to evaluate system performance in the future. Progress will be informed by data collected from sources including but not limited to:

- The decennial US Census and American Community Survey (ACS).
- Inspections of the condition of transportation assets by MassDOT and MBTA staff.
- Travel time, congestion, and reliability data from location-based services (LBS) reports.
- Massachusetts Household Travel Survey (MHTS) data.
- Rider surveys on the MBTA.
- Inventories of MassDOT assets which are updated as investment occurs.

The performance measures established in this Plan have been categorized in two ways: first, some measures are required for reporting to the US Department of Transportation (USDOT). These have been summarized in a *System Performance Report* (found in Appendix D) that complies with Federal Highway Administration (FHWA) requirements and includes targets for MassDOT to pursue.

Second, measures that respond directly to the barriers identified by Massachusetts residents and stakeholders have been assessed and recommended for inclusion in the MassDOT *Tracker* based on data availability and appropriateness for analysis over time. A small subset of the measures to be considered for inclusion in *Tracker* has been assessed by *Beyond Mobility* itself, a process described in more detail in Chapter 6.

System Performance Report

The *System Performance Report* responds to USDOT's 2016 series of rulemakings that established performance measures for the Federal-aid highway and transit programs. The Federal performance measure rules fall into three broad categories: safety (highway and transit); infrastructure condition (highway and transit); and system performance (highway only).

Notably, the highway requirements pertain to the National Highway System (NHS), the majority of which in the Commonwealth of Massachusetts is under MassDOT ownership. These targets are set directly by MassDOT and MPOs. By contrast, the transit requirements are primarily set by transit

operators with technical assistance and coordination from MassDOT and the MPOs. These operators include the MBTA and 15 RTAs.

Under Federal rules, MassDOT must include a description of Federal transportation performance measures and targets and a *System Performance Report* in its long range transportation plan. The report included in Appendix D evaluates the condition and performance of the transportation system for the Federal performance targets, including progress achieved by MassDOT in meeting those targets. Future system performance reports must also compare current performance with system performance recorded in previous reports.

3.0 What We Heard

3.1 Introduction

As noted in previous chapters, the six Priority Areas that serve as the structure of *Beyond Mobility* were directly derived from the public engagement process. This process included surveys, community activations, multilingual and multicultural focus groups and interviews, a virtual public meeting, Meeting-in-a-Box interactions with targeted stakeholders, and stakeholder interviews.

The first phase of engagement was designed to gain an understanding of the transportation vision and the transportation needs of residents and visitors traveling within Massachusetts. Through these community conversations, the six "Priority Areas" and related visions and values statements emerged:

- **Safety**
- **Reliability**
- **Supporting Clean Transportation**
- **Destination Connectivity**
- **Resiliency**
- **Travel Experience**

The public engagement input helped determine not only the six Priority Areas themselves but also how each is defined and experienced by different communities and transportation users. These Priority Areas, the future vision of transportation for each, and the values associated with upholding these visions became the building blocks of the Plan.

This chapter provides a summary of what was heard during the *Beyond Mobility* engagement process. The chapter begins with a high-level review of key public engagement findings, and then reviews what we heard with respect to each Priority Area.

Key Public Engagement Findings

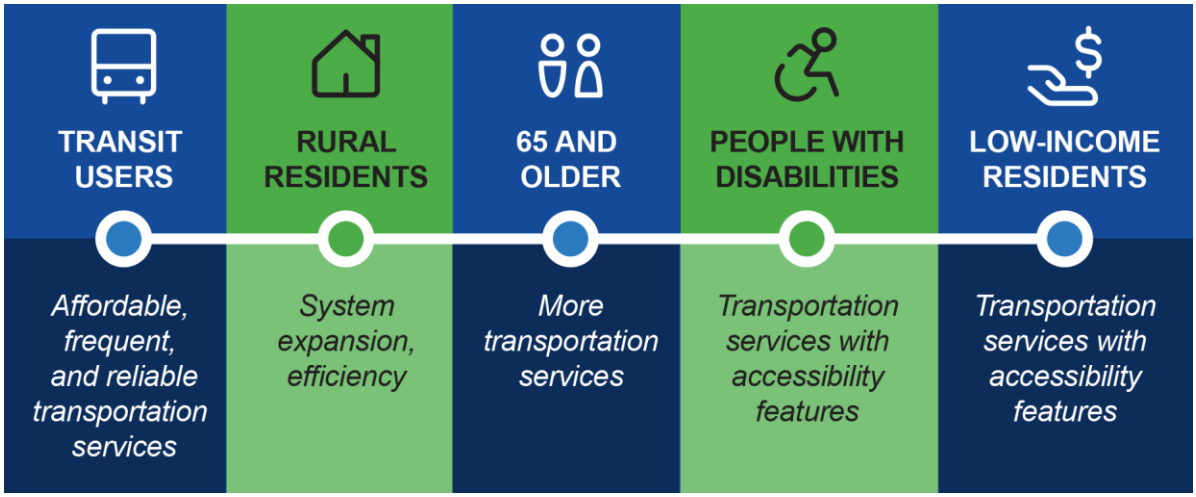
Through the public engagement process, several high-level themes and insights were identified and used to guide various elements of the final Plan. The first phase of public engagement focused on understanding residents' visions and needs for the future. Massachusetts residents' top values for a future transportation system underscored connectivity, reliability, safety, and a modernized user experience. Overall, respondents recognize that transportation is a pathway to opportunity (e.g., access to jobs, services, and other cultures and communities). However, a closer look at the values and priorities across demographic and modal user groups reveals differing opinions.

Survey responses indicated that reliability is a key quality of the future transportation system, especially among transit riders. When asked whether to expand, modernize, or maintain the

transportation system, modernization was most valued by respondents of color, while maintenance was most valued among respondents from rural areas and those aged 65 and older.

Throughout all public engagement activities, vehicle-free connectivity was documented as a critical need for all respondents. Individuals who cannot drive face many barriers, including access to affordable and reliable non-vehicle transportation modes. For those unable to drive, the availability of non-vehicular transportation options is the greatest barrier to access, followed by cost. Connectivity and coverage are more important to underrepresented groups than to all residents. Needs vary by community, as shown in Figure 3.1. Additionally, respondents from rural communities are isolated and without sufficient transportation options due to a lack of transit service and incomplete bicycle and pedestrian networks. Moreover, respondents reported that some transportation services lack appropriate features to support various needs and abilities, posing specific challenges to people aged 65 and older or with disabilities.

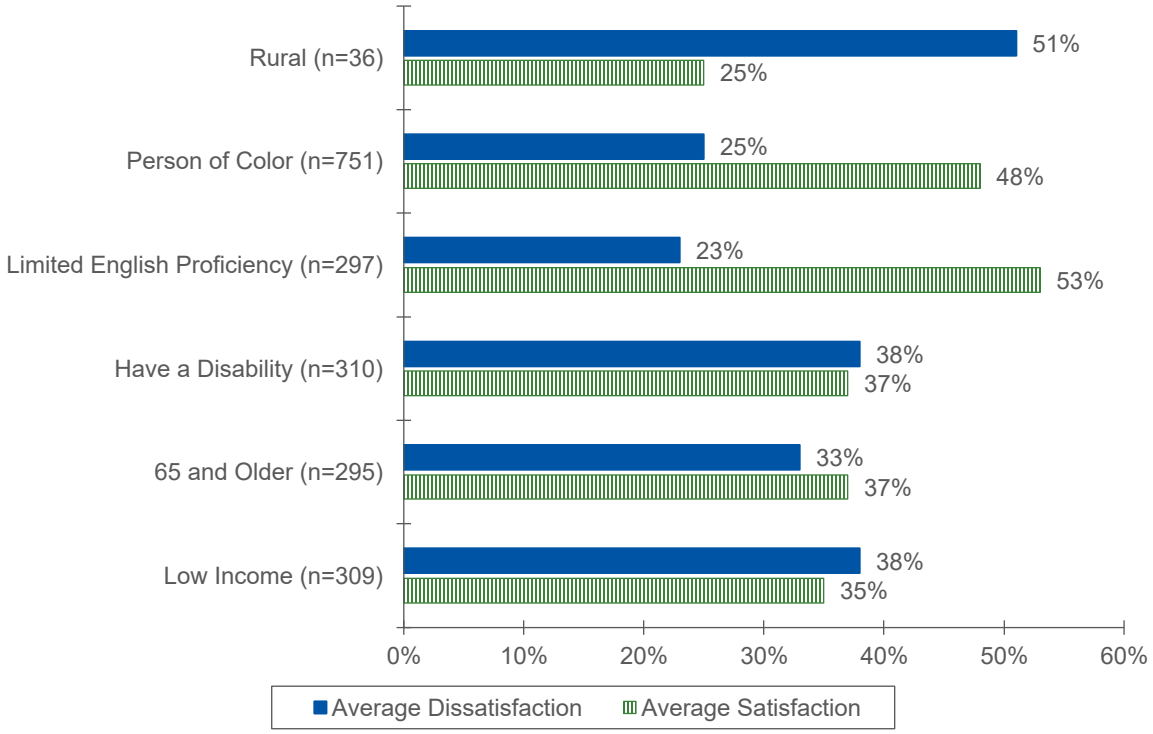
Figure 3.1 Top Connectivity and Coverage Needs by Population Group



Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

The importance of transportation connections to key destinations was mentioned repeatedly, with different demographic groups expressing various levels of satisfaction concerning connectivity to services. For example, respondents from rural communities were less satisfied with access to food retailers and health care services than other respondents. Low-income respondents and those with disabilities reported being less satisfied with access to jobs.

Figure 3.2 Satisfaction with Transportation Connections by Demographic Group



Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

Respondents felt the transportation system necessary to access critical destinations across the state—especially jobs, childcare, and medical facilities—is limited or nonexistent, which limits where people can live and age affordably.

Priorities

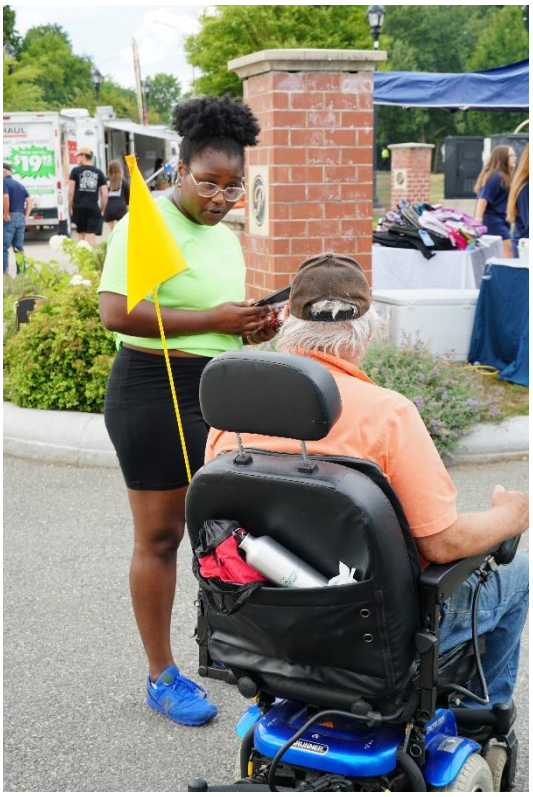
Respondents to the *Beyond Mobility* Phase II Priorities & Tradeoffs Survey had many suggestions for how to move toward a more connected Commonwealth. Over half of all survey respondents felt transit improvements are the most important funding priority for the state. There was an emphasis on east-west connectivity, including passenger rail service for the entire state and meaningful transportation options for rural residents to reach cities and other activity centers. Suggestions included expanding evening transit services and ensuring bus reliability statewide. Rural transit concerns highlighted the challenge of downtown transit hubs inflating transit commute times between destinations outside the city. Microtransit was a frequently cited need in rural areas where fixed route transit will likely not be relevant soon.

Nearly 27 percent of participants reported that pedestrian and bicycle connections are a top funding priority and almost 20 percent responded that more frequent bus service is the most important feature to improve the transit system, findings that were consistent for both urban and rural respondents.

Respondents raised specific concerns about multimodal connections, noting that most public airports are only accessible by automobile; transit stops and stations lack sufficient bicycle and pedestrian accommodations; and wayfinding signage is needed to improve connectivity between transit and key destinations. Non-English respondents were less interested in pedestrian and bicycle infrastructure when asked to prioritize roadway improvements.

Rural populations that lack transit infrastructure view the transition to electric vehicles in their communities as critical to meeting climate and sustainability goals. Respondents from rural communities were also more likely to be interested in electric vehicle charging infrastructure. Low-income respondents placed more importance on transit features on roadways than other groups.

Figure 3.3 Pittsfield Community Activation, Fall 2022



3.2 Safety

Safety is a broad term and can mean different things to different people, depending on the challenges or constraints of a particular geography, mode of transportation, or user group. Acknowledging this, *Beyond Mobility* public engagement was designed to better understand what a "safe transportation system" means for Massachusetts residents, what improvements people would like to see, and what challenges are faced by different user groups (e.g., by mode of travel, age, income, race, language, gender identity, or other demographic characteristics). This section describes major themes and findings from *Beyond Mobility* surveys, focus groups, interviews, public meeting comments, emails to the project team, and other public outreach.

Who is Most Concerned About Safety?

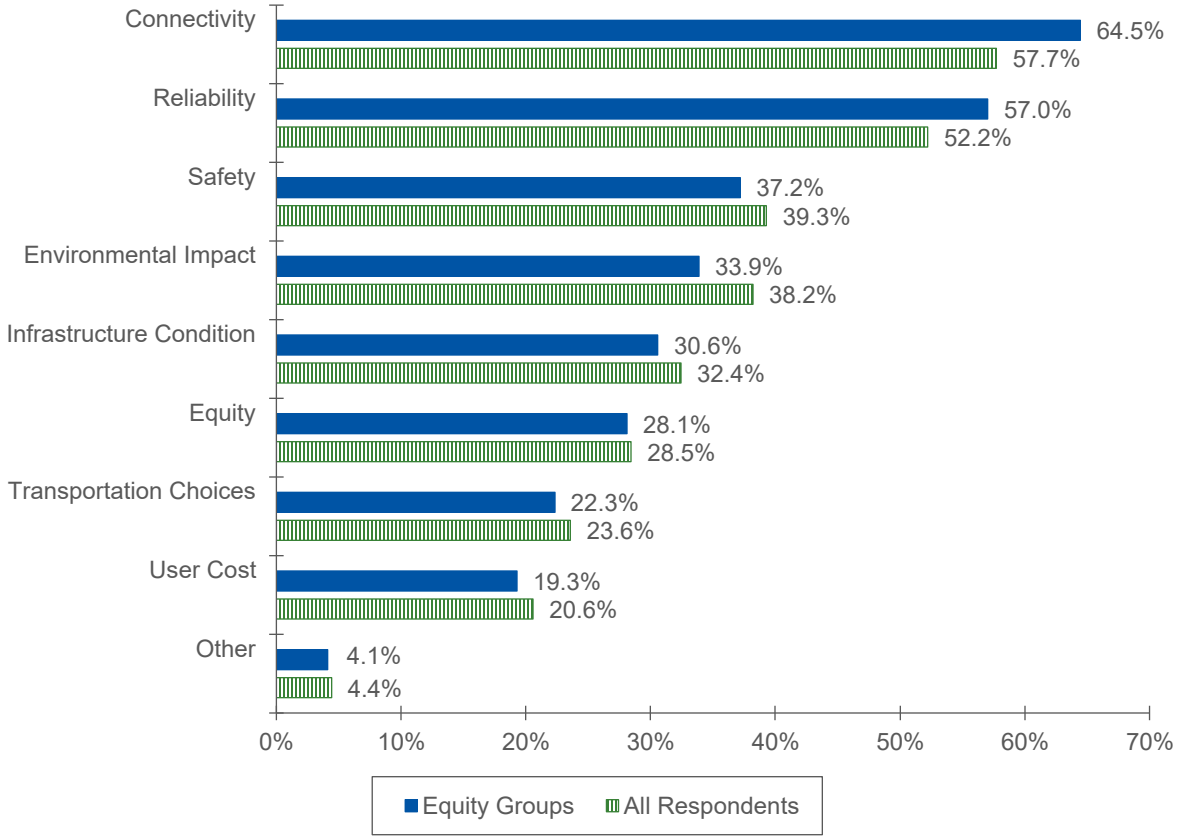
Safety was one of the top three qualities of an ideal future transportation system, along with connectivity and reliability, as gleaned through the *Beyond Mobility* Phase I Vision, Values, & Needs Survey. Of all respondents, 39 percent said they would like to see improvements in safety (see Figure 3.4).[2] While a need for increased safety levels was expressed by most participants, certain equity groups placed higher emphasis on making the Commonwealth's transportation system safer and more secure. For instance, respondents from rural communities placed greater value on system

[2] Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

expansion, efficiency, and transit accessibility than on safety, which highlights the lack of access to transit options in rural areas more generally.

Among equity groups, people of color reported safety concerns more than other groups, with 31 percent of the total survey respondents of color listing safety as an important priority for the ideal future transportation system for the state. Other equity groups reported safety concerns as well, but less than people of color.[3]

Figure 3.4 Top Values Chosen by Participants for Future Ideal Transportation System

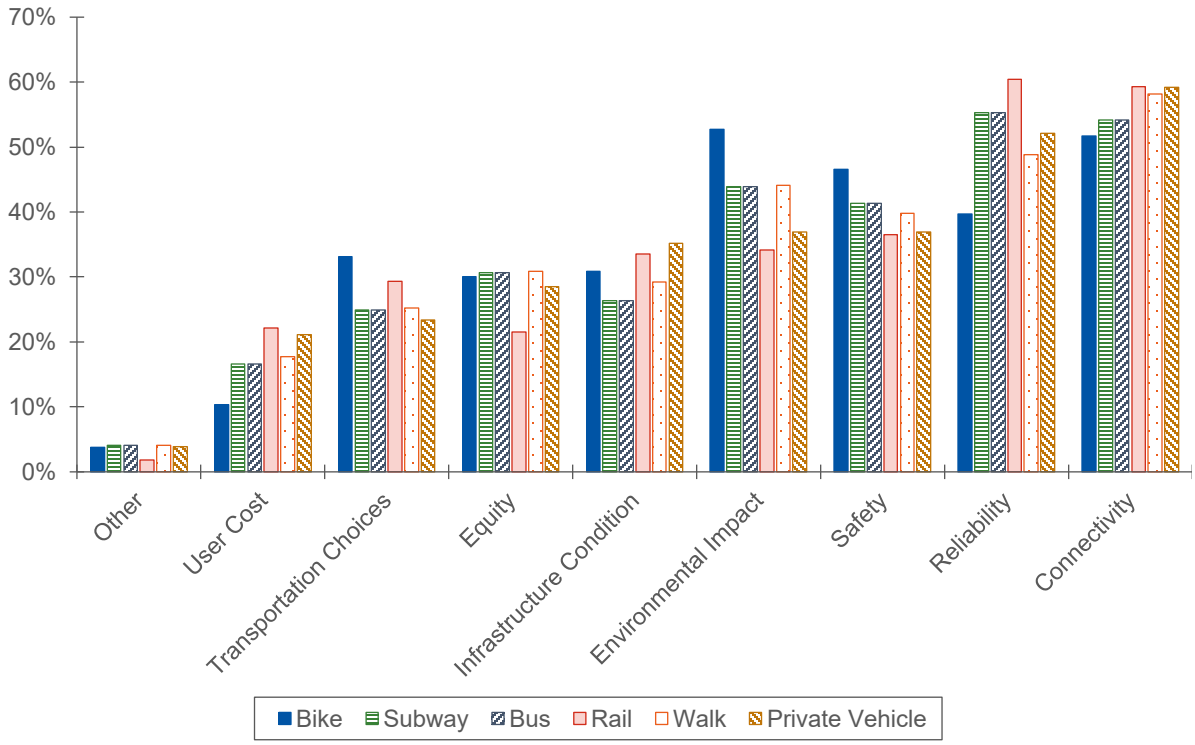


N=1,107
Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

Exploring safety concerns by transportation mode highlighted that bicyclists, transit users (both subway and bus users), and pedestrians are most concerned with safety. Of respondents who reported using bicycling as one of their modes of transportation, 47 percent selected safety as an aspect of the transportation system they would like to see improved or changed. More than 40 percent of transit user and pedestrian respondents also selected safety as an aspect to be improved (see Figure 3.5 below).[4]

[3] Safety chosen by 28 percent of respondents each from the low-income respondents and elderly (aged 65 and over) categories, and by 22 percent of the rural respondents.
[4] Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

Figure 3.5 Aspects Respondents Would Like to See Improved or Changed



N=1,107
Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

Existing Challenges: What Hinders Transportation Safety?

The feedback about the safety of the Massachusetts transportation network elicited responses reflecting a range of fears and uncomfortable situations—both perceived and experienced—around accessing and using different modes. A closer look at the various safety challenges faced by different groups highlights four kinds of fears attached to transportation settings and infrastructure:

- **Fear of crashes on roads** was a common concern among bicyclists and pedestrians. Participants described unmaintained or discontinuous walking/bike paths, dangerous path conditions including potholes, aggressive and rash driving habits among automobile users, and lack of sufficient sidewalks and bike paths.

- **Speeding** was a top concern across all outreach activities, including being cited at every stakeholder meeting in Phase III of engagement. From freight stakeholders to business owners to residents, slowing vehicle speeds are top of mind for many.

- Residents associate **state of good repair** with safety. Specifically, the proactive maintenance of active transportation infrastructure such as sidewalks and bike lanes were shared by participants in outreach activities.

- Stakeholders from rural parts of the Commonwealth, both in the West and the South, cited the **lack of basic infrastructure such as sidewalks and street lighting** as a major concern. Coupled with little to no cell service in many of these areas, travelers are faced with very little protection no matter the mode of travel.

- **Fear of victimization** from potentially harmful individuals was another important factor that resulted in poor security levels among locals, especially concerning accessing and using transit.

- Others described more general security concerns relating to crime and **fear of being attacked** rooted in several distinct reasons. For instance, Mandarin-speaking participants described feeling unsafe due to increased attacks against Asian people.

- An increased **fear of being infected post-COVID** due to the lack of space for social distancing when using transit was also a factor among some groups, especially older adults (aged 65 and above).

Notably, the design of transportation infrastructure itself was not explicitly mentioned as a safety concern. Rather, lack of dedicated infrastructure and poor upkeep of existing infrastructure were expressed frequently as the main reasons underlying the poor safety and security levels of different transportation modes. This sentiment is best reflected in the frequent use of phrases such as the following:

- Lack of bike lanes and dedicated bike infrastructure

- Lack of sidewalks or abrupt ends in walking and bicycling infrastructure

- Potholes

- Fading road signs

- Poorly timed crosswalk signals

- Dirty, unclean, or dark subway station areas and trains

Navigating the above-discussed challenges often led people to adopt several practices to avoid danger and ensure safe mobility. Some of the strategies that emerged from the surveys included avoiding specific areas, routes, or transit stops; using certain modes of transportation that offer a greater sense of security (e.g., cars or taxis); or not using certain modes that require being in unsafe conditions (such as bicycling in certain areas). Ensuring the safety and security levels of different users accessing and using different transportation options was a priority for those who participated in *Beyond Mobility* outreach opportunities.

Vision for a More Safe and Secure Transportation System

When asked about the top three qualities of a successful transportation system, *Beyond Mobility* participants were quick to cite safety. Respondents primarily called for two kinds of interventions to increase security and safety levels, as listed below:

- Respondents asked for the **deployment of more security personnel and security cameras** at bus stops, train stations, and subway stations for an enhanced sense of security when traveling.
- **Physical infrastructure improvements and upgrades** are highly desired by residents. Participants emphasized the need for more sidewalks to protect pedestrians from potential collisions with speeding vehicles and buses. Bicyclists expressed their desire to have more dedicated bike lanes and bike-locking infrastructure. Transit users suggested better partitions between awaiting passengers and railways/roads for enhanced safety levels. A desire for enclosed spaces during cold weather was also a priority to ensure passengers could comfortably and safely wait at bus stops and stations.

Spanish Speakers, Focus Group

"We need more security at the stations. More! I would hope they would fix all the problems with the train tracks. There have been a lot of technical problems with them recently."

Black Community, Focus Group

"I know that Ms. XX mentioned something about the bus lanes that are in the middle of the street and how they're not really safe. And they're not. You're literally letting off people who are elderly, maybe people who are wheelchair bound, or who need handicap access. You're now letting them off in the middle of the street, instead of on the sidewalk. And this is something that they need to, it's now another challenge that they have to face.

3.3 Reliability

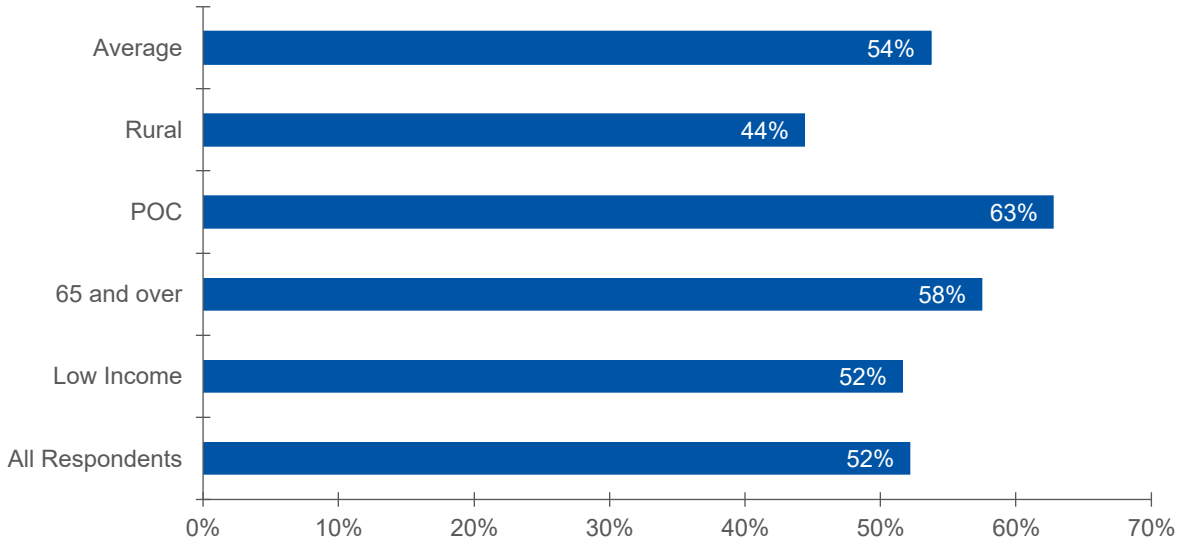
Reliability is an integral function of any transportation system. In transportation planning, travel time reliability measures the extent of unexpected delays that travelers experience, representing the consistency and dependability of trips. In this context, reliability represents the degree to which people can feel confident in their travel experience and the amount of time that it will take. Reliability relates to every part of transportation—operations, infrastructure, maintenance, and travel experience—and is crucial across all types of transportation assets. However, reliability is also impacted by a wide variety of recurring and non-recurring factors, many of which are unseen to transportation system users.

Among respondents to the *Beyond Mobility* Phase I Vision, Values, & Needs Survey, reliability is seen as the core function of the transportation system. When ranking current aspects of the transportation system to be improved or changed, one respondent remarked "Shouldn't reliability NOT be a 'choice' for transportation?" Travel time, wait time, safety, and affordability are key to respondents' experience of reliability.

Who is Most Concerned about Reliability?

Across the *Beyond Mobility* planning process, participants highlighted reliability as a top concern and priority. When asked to identify up to three top priorities, 54 percent of all respondents selected reliability (Figure 3.6). Some equity groups, such as people of color and those over the age of 65, prioritized reliability at even higher rates (63 percent and 58 percent, respectively).

Figure 3.6 Respondents Wanting Reliability to be Improved or Changed by Equity Group

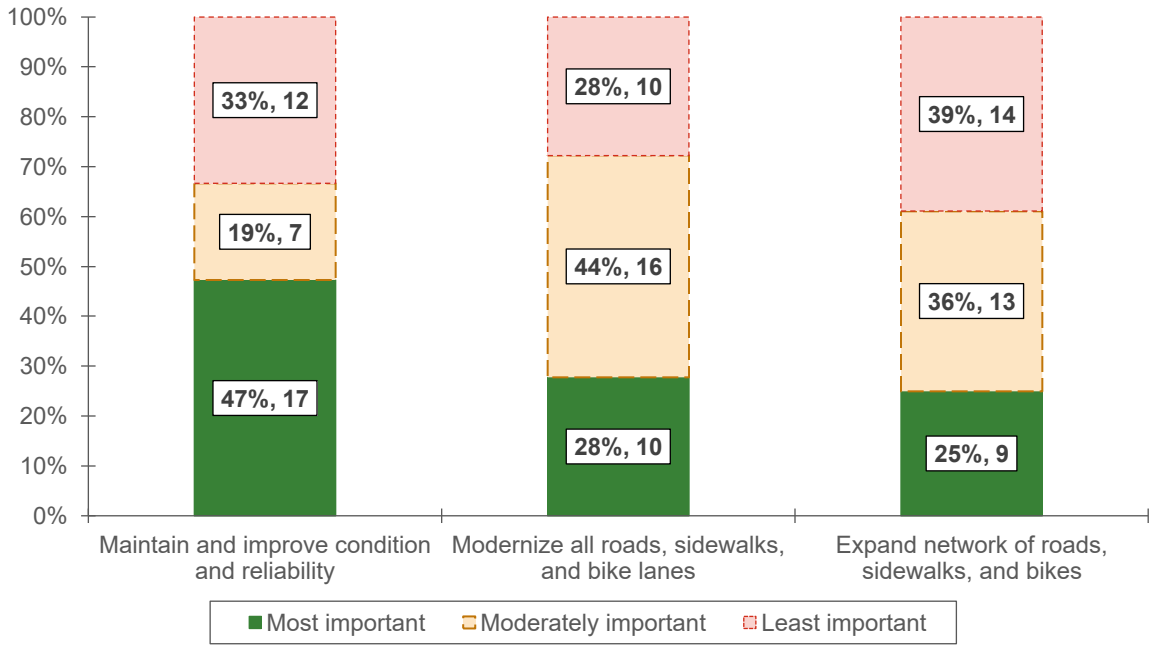


N=1,107
Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

This keen interest in reliability is evident when looking at the results by mode. Across all modes, the prioritization of reliability is most pronounced among transit riders (rail, bus, and subway). Approximately 60 percent of passenger and Commuter Rail riders selected reliability as a key priority. Similarly, 55 percent of bus and subway riders and 52 percent of single-occupancy vehicle (SOV) drivers prioritized reliability.

Reliability was frequently the “most important” priority among equity groups participating in visioning focus groups, composed of people who are most reliant on public transportation (Figure 3.7). Urban interviewees and participants in *Beyond Mobility* multilingual focus groups reported that financial and legal barriers to vehicle ownership forced them to use public transportation, which they found less reliable than personal vehicles. Multilingual interviewees (many immigrants, people of color, people with limited English proficiency, and/or low-income earners) reported challenges in acquiring a driver’s license or affording a private vehicle, also meaning they had to use (less reliable) public transportation.

Figure 3.7 Priorities for Massachusetts Transportation System

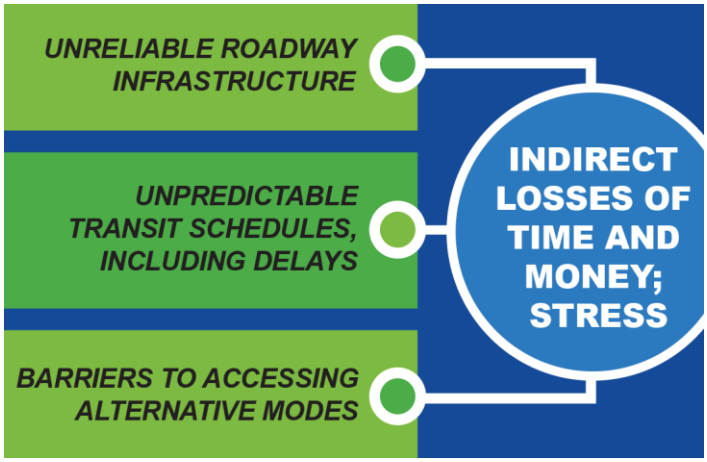


N=40

Existing Challenges: What Hinders Reliability?

Residents across Massachusetts expressed challenges around reliability (Figure 3.8). Around Boston, many residents expressed concerns over "ghost buses" (i.e., a trip that exists on a GPS-based information system such as Google Maps but is not scheduled by the agency); maintenance-related delays or disruptions (e.g., potholes and train breakdowns); and the connection between highway infrastructure and congestion. Outside of Boston, residents mentioned the need for late night and weekend transit service, and unpredictable transit availability.

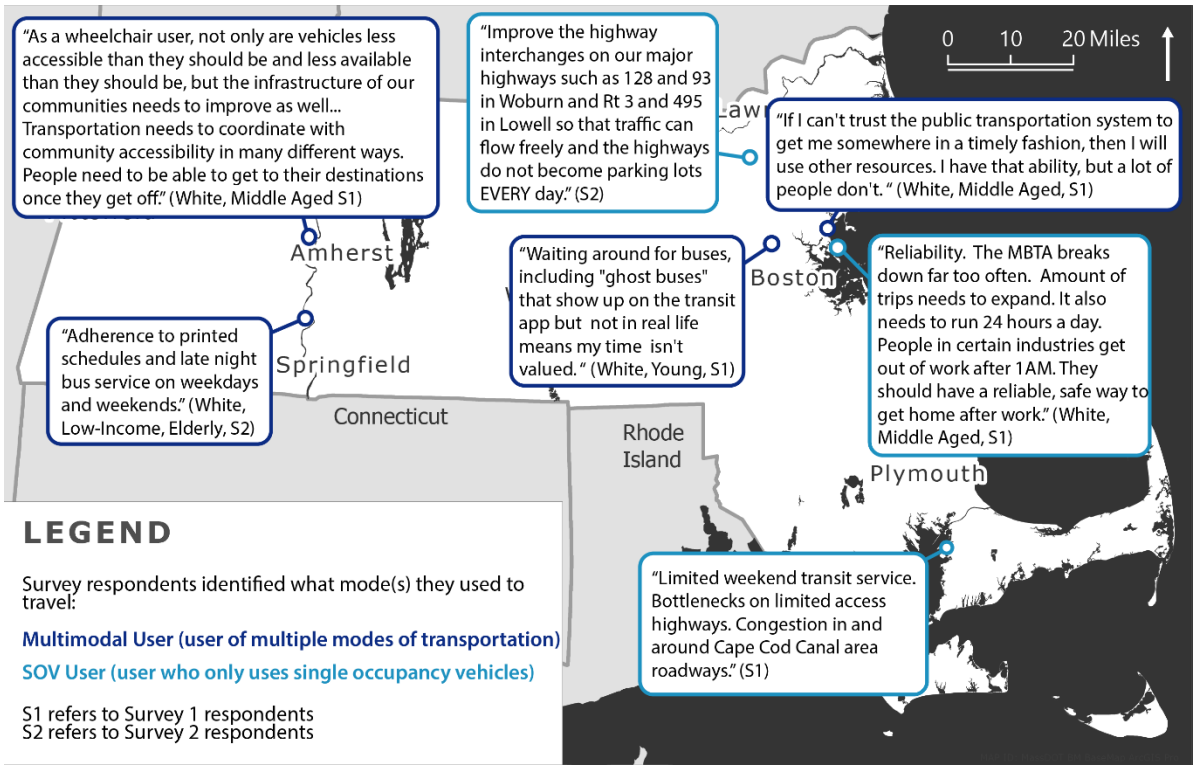
Figure 3.8 Key Elements of Public Feedback on Reliability


UNRELIABLE ROADWAY INFRASTRUCTURE
UNPREDICTABLE TRANSIT SCHEDULES, INCLUDING DELAYS
BARRIERS TO ACCESSING ALTERNATIVE MODES
INDIRECT LOSSES OF TIME AND MONEY; STRESS

Unreliable transit service generates distrust and disincentivizes the use of transit. Twenty-eight percent of the *Beyond Mobility* Phase I Vision, Values, & Needs Survey respondents cited delays, unpredictable schedules, and/or lack of reliability in mass transit as a challenge in trying to travel around the Commonwealth. Respondents noted that this unreliability is particularly detrimental for those without personal vehicles in rural areas or those living in communities without multimodal

roadway facilities (e.g., sidewalks). Figure 3.9 highlights residents' experiences with unreliability across modes and services, accentuating cascading challenges across Massachusetts communities.

Figure 3.9 Various Reliability Challenges Reported by Respondents[5]


"As a wheelchair user, not only are vehicles less accessible than they should be and less available than they should be, but the infrastructure of our communities needs to improve as well... Transportation needs to coordinate with community accessibility in many different ways. People need to be able to get to their destinations once they get off." (White, Middle Aged S1)
"Improve the highway interchanges on our major highways such as 128 and 93 in Woburn and Rt 3 and 495 in Lowell so that traffic can flow freely and the highways do not become parking lots EVERY day." (S2)
0 10 20 Miles
"If I can't trust the public transportation system to get me somewhere in a timely fashion, then I will use other resources. I have that ability, but a lot of people don't. " (White, Middle Aged, S1)
Amherst
"Waiting around for buses, including "ghost buses" that show up on the transit app but not in real life means my time isn't valued. " (White, Young, S1)
Boston
"Reliability. The MBTA breaks down far too often. Amount of trips needs to expand. It also needs to run 24 hours a day. People in certain industries get out of work after 1AM. They should have a reliable, safe way to get home after work." (White, Middle Aged, S1)
"Adherence to printed schedules and late night bus service on weekdays and weekends." (White, Low-Income, Elderly, S2)
Springfield
Connecticut
Rhode Island
Plymouth
LEGEND
Survey respondents identified what mode(s) they used to travel:
Multimodal User (user of multiple modes of transportation)
SOV User (user who only uses single occupancy vehicles)
S1 refers to Survey 1 respondents
S2 refers to Survey 2 respondents
"Limited weekend transit service. Bottlenecks on limited access highways. Congestion in and around Cape Cod Canal area roadways." (S1)

Vision for a More Reliable Transportation System

Despite challenges, residents expressed promising visions of the future related to expanded service, enhanced communication, expanded service hours, and accessible multimodal transportation options.

- Transportation with **more predictable, frequent, and redundant service** will improve users' confidence that the system can deliver them to their destinations, no matter the day, time, or location. Transit services arrive on time and are predictable.

Expanded Service

"A great transportation system for me would be reliable to the point I would never have to worry about being able to get to a necessary medical appointment, school, and/or work. A great transportation system should be there to replace or serve as an accessible option in lieu of a personal vehicle that I might not be able to operate or afford to have on my own." *(Dracut, White, Low Income, Multimodal User)*

5 The map identifies user mode given the diverse experiences of drivers versus transit riders.

- **Clear and timely communication** when there are delays, particularly using transit. Some residents expressed a hope that compensation be tied to trip disruptions so that they could afford alternative modes.

- **Operating hours** extend to later in the evening with more operating hours on the weekends. This allows for more reliable transportation for those traveling at off-peak hours.

Enhanced Communication

"Consistent communication and transparency from transportation providers regarding delays, plans, and projects." *(Somerville, White, Urban, Young, Multimodal User)*

- **Abundant transportation alternatives** exist beyond single-occupancy vehicles. Traffic congestion is a major cause of stress for residents. They desire better ways to travel that allow them to save money, time, and energy. Part of this vision includes enhanced **multimodal infrastructure**. Building facilities for micromobility and non-motorized modes of transportation helps create enhanced reliability in non-urban parts of the state, generating system-wide benefits.

Abundant Alternatives

"Once I enter the system I want to have access to information regarding the elements of my trip including possible alternatives." *(Anonymous)*

- Participants from many of the stakeholder groups in Phase III of engagement emphasized that **improved reliability of both rail and bus services** would help increase the reliability on roadways. Stakeholders emphasized that reliability not only encompasses knowledge of when buses or trains will be on time, but also being able to reliably take the bus or train in the early morning or late evening, ensuring those who work at these hours are still able to reliably get to work despite the time of day.

3.4 Supporting Clean Transportation

In 2019, transportation was responsible for 42 percent of greenhouse gas (GHG) emissions in the Commonwealth. Massachusetts residents recognize the negative impact that emissions from the transportation system have on the local environment and community well-being. They are also attuned to the extent to which harmful emissions impact historically underserved areas.

Residents see the prioritization of clean transportation as not only a way of accomplishing climate goals, but as a way to expand transportation choices, fill gaps in the transportation network, and achieve social and geographic equity. "Clean transportation" refers to transportation modes with low to zero harmful emissions. This could include cases where those lower emissions are achieved through the use of alternative fuels, energy-efficient vehicles (e.g., electric, hybrid, battery electric, etc.), or mode shift to transit or zero-emission modes such as bicycles or scooters.

Massachusetts residents see cleaner transportation modes as a path towards safer streets, more connected and denser communities, and a cultural shift towards prioritizing people over "business as usual" transportation. They emphasized the importance of clean transportation that is inclusive, affordable, and commonplace.

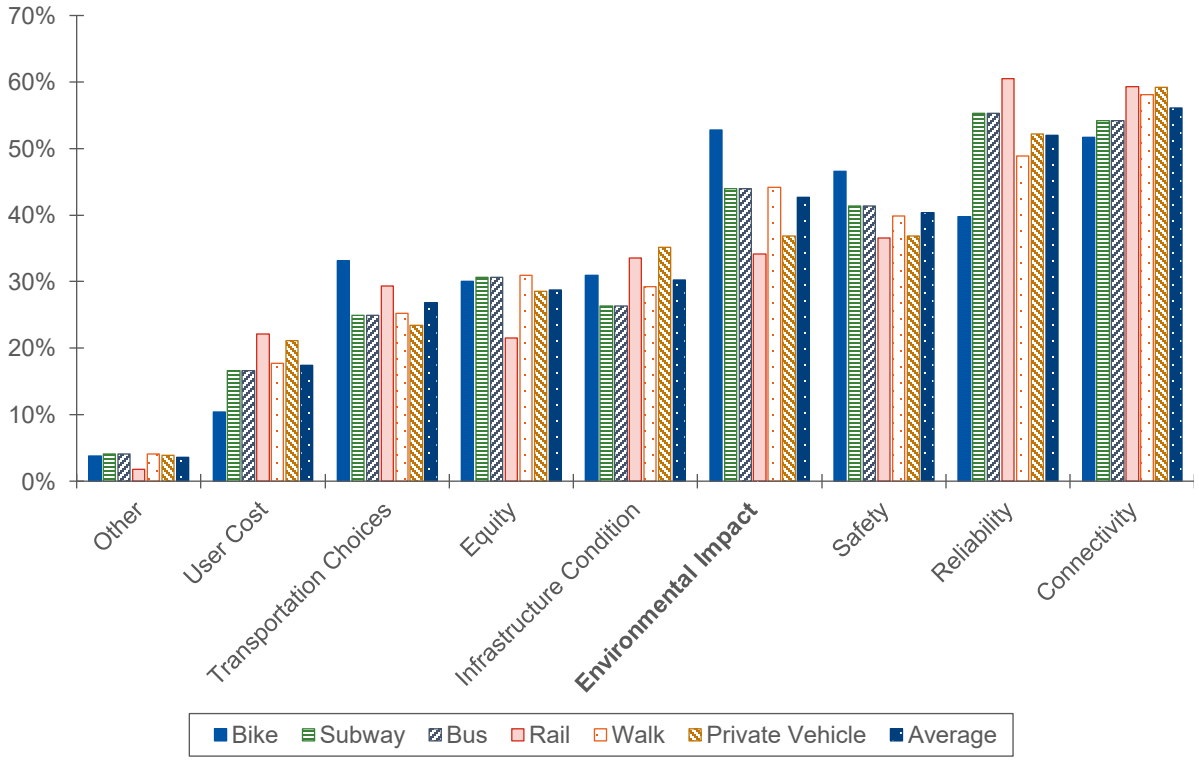
Who is Most Concerned About Clean Transportation?

As a part of the *Beyond Mobility* Phase I Vision, Values, & Needs Survey, 43 percent of all respondents across all transportation modes highlighted environmental impact as a key aspect they would like to see improved or changed in their lifetimes (Figure 3.10). Bicyclists ranked environmental impacts most highly with 53 percent.

Many of the qualities summarized in Figure 3.10 overlap with one another, and several relate to clean transportation. Though environmental impact was the fourth-ranked choice overall, public outreach indicated that system users view supporting clean transportation as a blend of values around connectivity, equity, safety, and reliability. Residents desire cleaner, more accessible, and reliable modes of travel, which often refers to their dependence on vehicles to reach near and far destinations.

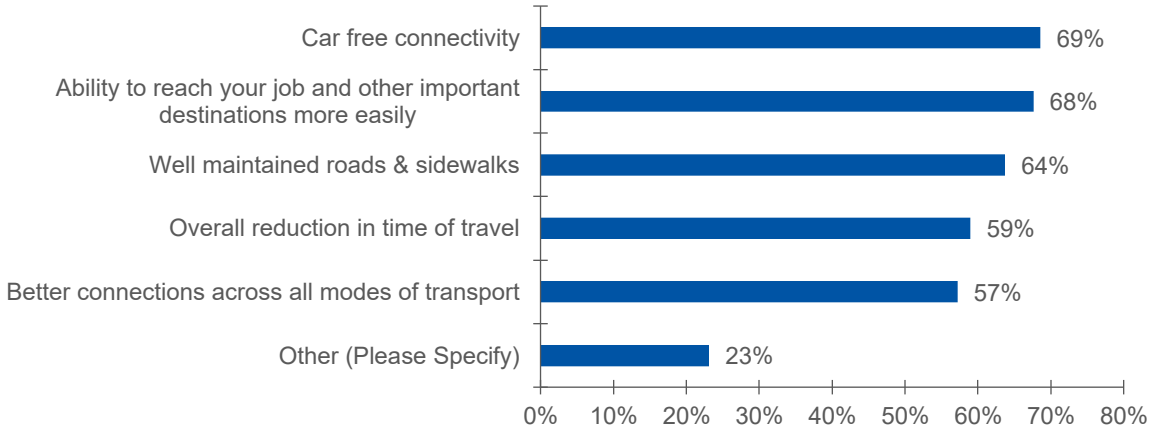
As shown in Figure 3.11, an overwhelming 69 percent of *Beyond Mobility* Phase II Priorities & Tradeoffs Survey respondents aligned a "flawless" transportation system with car-free connectivity. The majority of respondents statewide want to explore clean (e.g., multimodal options) and alternative (e.g., electric vehicles) ways to move (Figure 3.12). Around 72 respondents specifically mentioned "electrification" in their responses to *Beyond Mobility* Phase I Vision, Values, & Needs and Phase II Priorities & Tradeoffs survey questions.

Figure 3.10 Aspects of the Transportation System Respondents Would Like to See Improved or Changed by Mode



N=1,107
Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

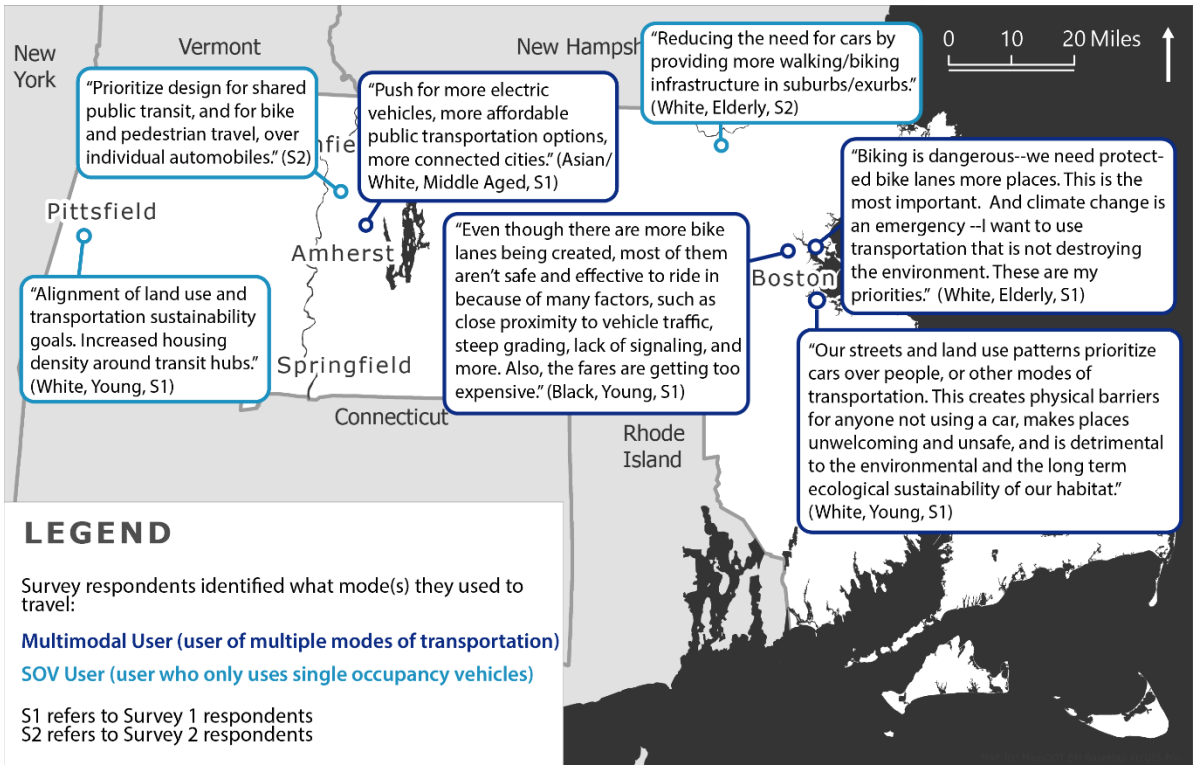
Figure 3.11 All Respondents Elements of a Great Transportation System



N=2,543
Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

Figure 3.12 offers examples of how clean transportation is viewed by residents in different areas of the state. Respondents emphasize the importance of prioritizing people over automobiles, with Boston residents in particular noting opportunities for expanded bicycle use. Residents outside of the Greater Boston area highlight areas for better alignment of transportation and land use to create more connected, dense urban areas.

Figure 3.12 Visions and Challenges for Clean Transportation


New York
Vermont
New Hampsh
0 10 20 Miles
"Prioritize design for shared public transit, and for bike and pedestrian travel, over individual automobiles." (S2)
"Push for more electric vehicles, more affordable public transportation options, more connected cities." (Asian/ White, Middle Aged, S1)
"Reducing the need for cars by providing more walking/biking infrastructure in suburbs/exurbs." (White, Elderly, S2)
"Biking is dangerous--we need protected bike lanes more places. This is the most important. And climate change is an emergency --I want to use transportation that is not destroying the environment. These are my priorities." (White, Elderly, S1)
Pittsfield
Amherst
Boston
"Alignment of land use and transportation sustainability goals. Increased housing density around transit hubs." (White, Young, S1)
"Even though there are more bike lanes being created, most of them aren't safe and effective to ride in because of many factors, such as close proximity to vehicle traffic, steep grading, lack of signaling, and more. Also, the fares are getting too expensive." (Black, Young, S1)
Springfield
Connecticut
Rhode Island
"Our streets and land use patterns prioritize cars over people, or other modes of transportation. This creates physical barriers for anyone not using a car, makes places unwelcoming and unsafe, and is detrimental to the environmental and the long term ecological sustainability of our habitat." (White, Young, S1)
LEGEND
Survey respondents identified what mode(s) they used to travel:
Multimodal User (user of multiple modes of transportation)
SOV User (user who only uses single occupancy vehicles)
S1 refers to Survey 1 respondents
S2 refers to Survey 2 respondents

Existing Challenges: What Hinders Clean Transportation?

Transportation systems and priorities differ across Massachusetts, with people in different regions supporting a broad spectrum of qualities related to clean transportation. However, there were some general themes (Figure 3.13) that weave many comments together: **supporting active transportation, car-free connectivity, inclusivity,** and **environmental benefits.**

Figure 3.13 Supporting Clean Transportation Themes

ACTIVE TRANSPORTATION	CAR-FREE CONNECTIVITY	INCLUSIVITY	ENVIRONMENTAL BENEFITS
"Switching modes supported - such as lots of integrated, covered bike parking at train and bus stations" (Native American, Middle-Aged, Urban, Multimodal) "I really like to walk when I am trying to get somewhere, but there are no sidewalks, that is another huge challenge." (Haitian Creole, Focus Group) "Good sidewalks and bike lanes for the last mile. That means tree lined streets everywhere, ability to cross streets safely. The climate crisis should be driving our decisions...And good service to get people out of their cars." (Asian, 65+, Suburban SOV)	"Increased shift away from car-dependent infrastructure and more focus on public transportation and biking." (White, Young, Urban, Multimodal) "Less dependence on gas powered personal vehicles." (White, 65+, Rural, SOV) "Can safely walk to many daily destinations. Can get efficiently car-free to locations throughout the state and region. Be part of the solution for addressing climate change." (White, 65+, Suburban, SOV)	"Robust EV charging infrastructure to be distributed in an equitable way." (White, Middle-Aged, Low Income, Rural) "Eco friendly without being too expensive." (White, Young, Urban, Multimodal) "Without transportation solutions to reduce GHG, our roadways will continue to be clogged with dangerous and polluting vehicles that are dirtying our air and harming our pedestrians and cyclists, who are at greater risk than ever, especially in low-income communities and communities of color." (*Capital Investment Plan*)	"Alignment of land use and transportation sustainability goals." (White, Young, Rural, Multimodal) "Deep reductions in pollution and a system that has pollution prevention priority - including noise pollution." (White, 65+, Urban, Multimodal) "Helps me get around without a highly negative environmental impact due to fossil fuel usage." (White, Young, Urban, Multimodal)

Sources: Beyond Mobility Phase I Focus Groups & Interviews, 2022, Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022, Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022, Massachusetts Capital Improvement Plan, SFY 2022.

Statewide, there is a strong belief that low-emission travel is culturally and monetarily under-invested in, despite the benefits it brings. Residents see the association between clean mode choice and higher levels of system connectivity, sustainability, and mobility, leading to increased health and environmental outcomes, inclusivity, affordability, and equity. Importantly, residents view clean transportation as an investment tool for marginalized communities, especially communities that are adjacent to freight hubs, low-income populations, and/or predominantly people of color, incentivizing interest even more.

These comments highlighted several existing challenges:

- Residents perceive an **auto-centrism that prevents places from feeling welcoming, safe, and pleasant.** Residents recognize that current land use patterns prioritize cars over people and construct visible (and invisible) barriers. System users feel that car-free lifestyles and active transportation are critical components of a clean transportation system.

- **Taking control of reducing residents' carbon footprints is a challenge given existing travel options.** Young people in particular see driving as both inconvenient and harmful to the environment. Without mode choice and options, residents feel their priorities and desires are not being met.

- A majority of survey respondents cited car-free connectivity as a feature of a flawless transportation system. **Cars are inaccessible to many** due to rising energy costs, as well as increasing costs of vehicles and maintenance, leading to limited access to opportunity. Individuals who would rather use transit or active modes cannot do so in a safe or easily accessible way due to a lack of existing infrastructure (e.g., protected bike lanes, continuous sidewalks, integrated bike share/bike racks/repair stands at transit stations, and traffic calming measures).

- The **availability, or lack thereof, of electric vehicle charging stations** is a concern shared by many stakeholders across various demographics—from freight transportation providers to residents trying to locate a place to charge their vehicle. Furthermore, it is not just the existence of charging stations in proximity to the people that need them, but also the reliability of those stations being operational and available for use that is important to residents.

Vision for a Cleaner Transportation System

By focusing on multimodal, low-emission options, Massachusetts can build a future where people do not need to rely on automobiles. Residents expressed a clear vision of engaging in the effort to tackle the climate crisis:

- Residents view **clean transportation as a gateway to better public health outcomes, enhanced reliability, strong environmental stewardship, and greater personal mobility.** Clean transportation options, including non-motorized transportation, should be approached as opportunities to generate other positive quality-of-life benefits.

- Residents feel confident in a transportation system when it is **flexible and dynamic**. Options such as micromobility are important pieces of personal mobility and lifestyle choices; investing in these modes will bolster confidence in the transportation system's ability to be dynamic. They want to see a transportation system that is readily accessible and can accommodate individual preferences while also benefitting the planet and communities.

- Residents recognize that investing in transit-oriented development (TOD), maintaining denser and affordable housing near transit, and using micromobility and active transportation to fill in network gaps will build a **connected, robust, and environmentally friendly transportation system**. It will also enable deeper community-building and access to opportunity. Intentional and equitable planning is necessary to maintain affordability and ensure all residents can experience clean transportation modes.

- Residents also desire the **equitable distribution of public electric vehicle (EV) charging stations and alternative fuel modes**. A robust, statewide network of EV charging stations may reduce reliance on fossil fuels by providing people with long-distance charging confidence while demonstrating public support and enabling cost savings for consumers. This includes expanding options to communities that rely on public transit the most, allowing for all residents to experience and adapt to new technology while offering alternatives in case of an asset loss or service disruption.

3.5 Destination Connectivity

MassDOT believes that the primary purpose of the transportation system is to connect people to the places they need and want to go. The ability to reach everyday destinations is critical to improving the quality of life for all Massachusetts residents, including transit riders, drivers, and multimodal users.

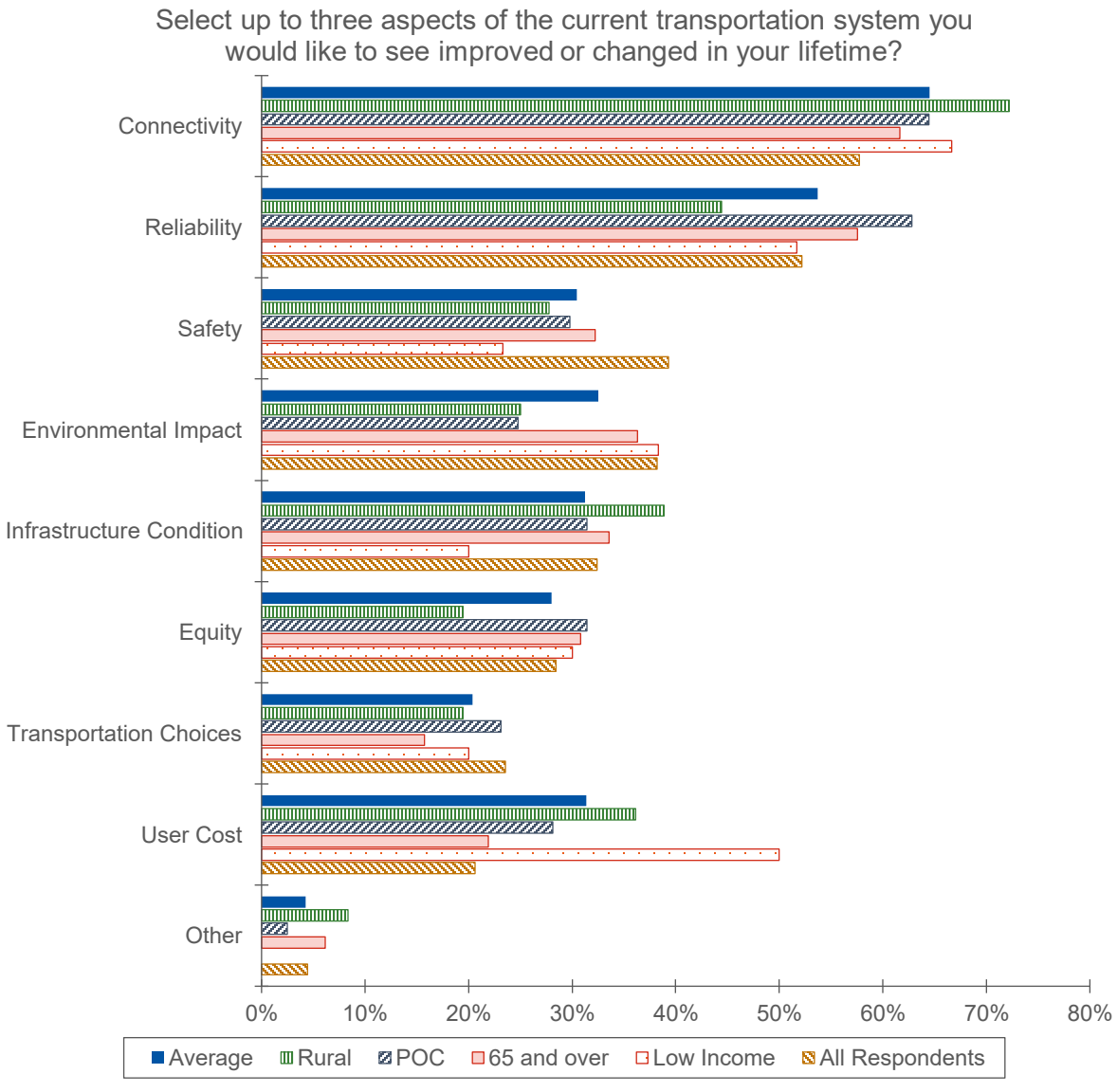
Connectivity to destinations is also one of the primary factors in how residents evaluate the transportation system. If residents cannot connect to and from their everyday places, they perceive their experience as fragmented and difficult, and begin to doubt the system and its ability to serve their daily networks sufficiently. Every system user has different destinations and thus different experiences of system connectivity.

At the regional level, roadways and public transportation impact access to economic, social, and healthcare opportunities. Public transportation connections are particularly vital to ensure access for people unable to drive, such as members of low-income households, immigrants, children, individuals with disabilities, and older adults. Rural residents and historically marginalized communities often find it more challenging to reach key destinations, which results in negative travel experiences.

Who Is Most Concerned about Destination Connectivity?

Of the 1,107 respondents in the *Beyond Mobility* Phase I Vision, Values, & Needs Survey, all respondents chose connectivity as a top priority to change or improve in their lifetime. Rural and low-income respondents expressed particular support for connectivity, at 72 percent and 64 percent, respectively (Figure 3.14). Though the experience of connectivity differs across demographic groups and geographies, over 50 percent of all users by mode (bicyclists, pedestrians, private vehicle drivers, and users of the subway, bus, and Commuter Rail) selected destination connectivity as a key element of a well-functioning transportation system—more so than any other category.

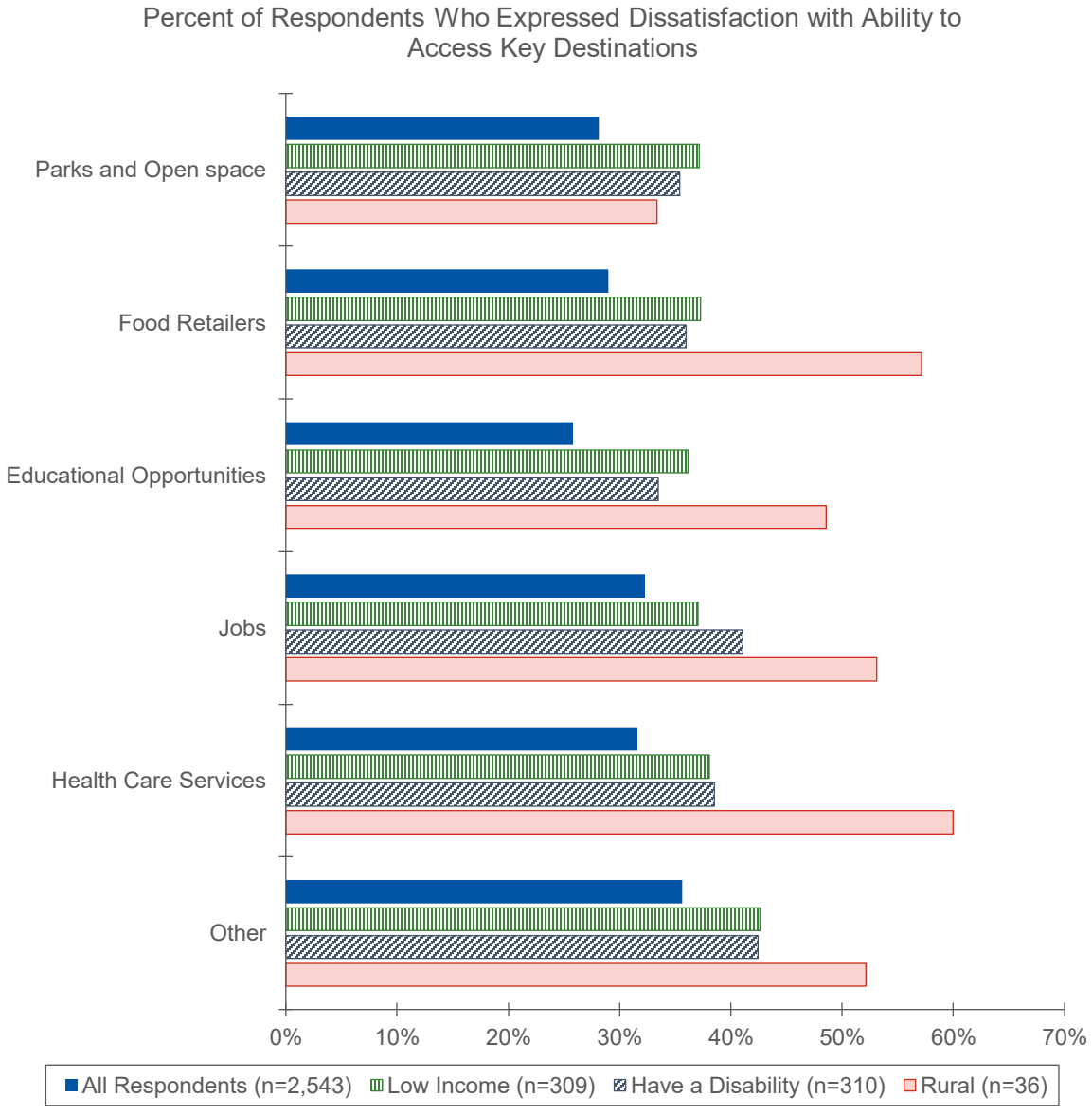
Figure 3.14 Top Priorities for Massachusetts' Transportation System



N=1,107
Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

In reporting satisfaction with accessing certain key destinations, respondents from rural communities, earners in the lowest income brackets, and individuals who have a disability reported the highest levels of dissatisfaction compared to the survey group as a whole; for example, over 50 percent of respondents from rural communities reported dissatisfaction in accessing food retailers, jobs, health care services, and "other" destinations (Figure 3.15). These results indicate that there is a high demand for improved transportation connections to these areas, particularly within Massachusetts' rural communities.

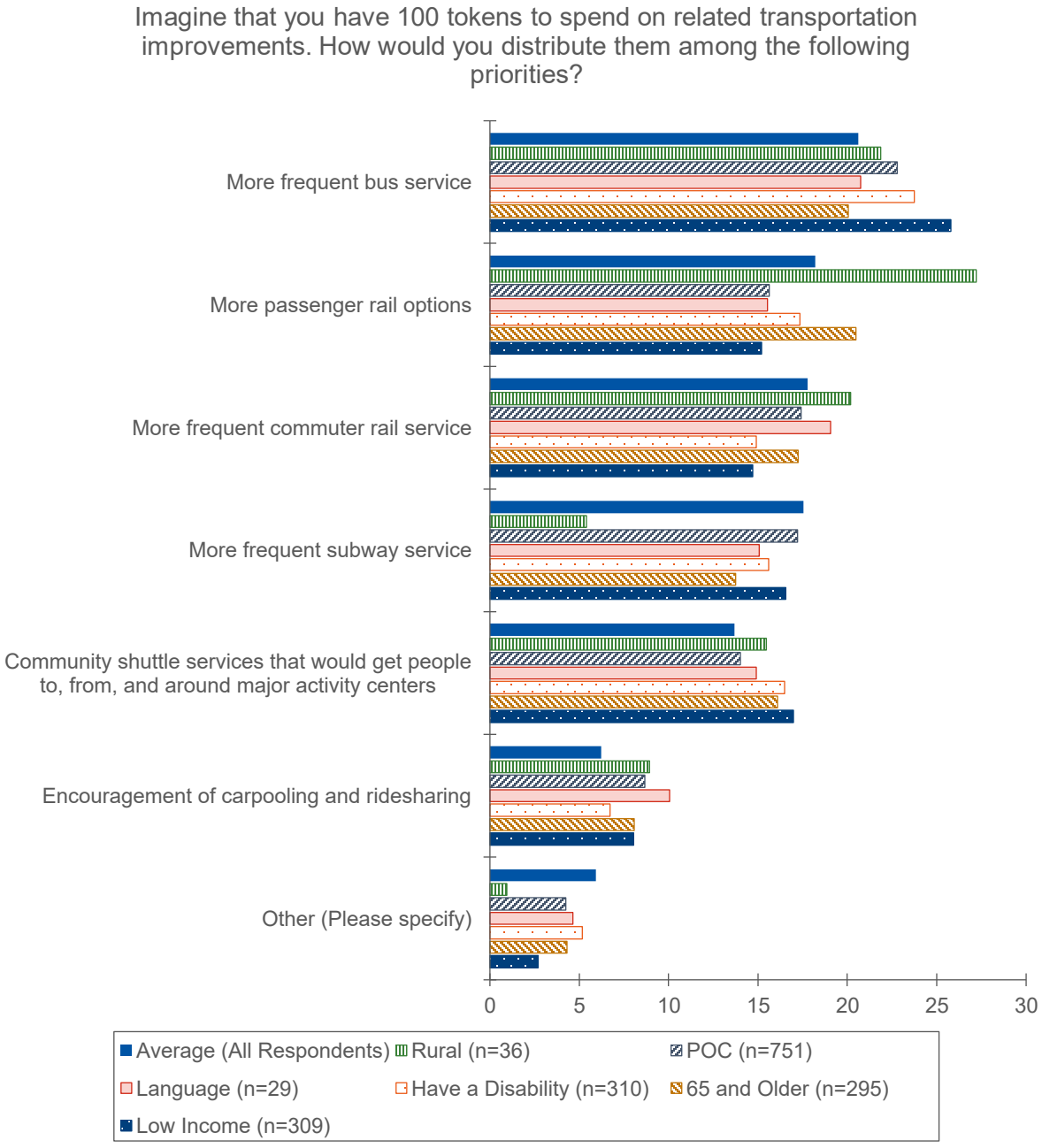
Figure 3.15 Dissatisfaction with Connectivity to Destinations: Rural, Low-Income, and Individuals with a Disability Compared to All Respondents



N=2,453
Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

As shown in Figure 3.16, survey respondents were asked to assign value to various kinds of transit improvements. On average, all respondents ranked more frequent bus and Commuter Rail services, and more passenger rail options the highest. Residents in rural communities heavily favored increased rail connections. Low-income residents, people of color, and individuals with disabilities favored more frequent bus service.

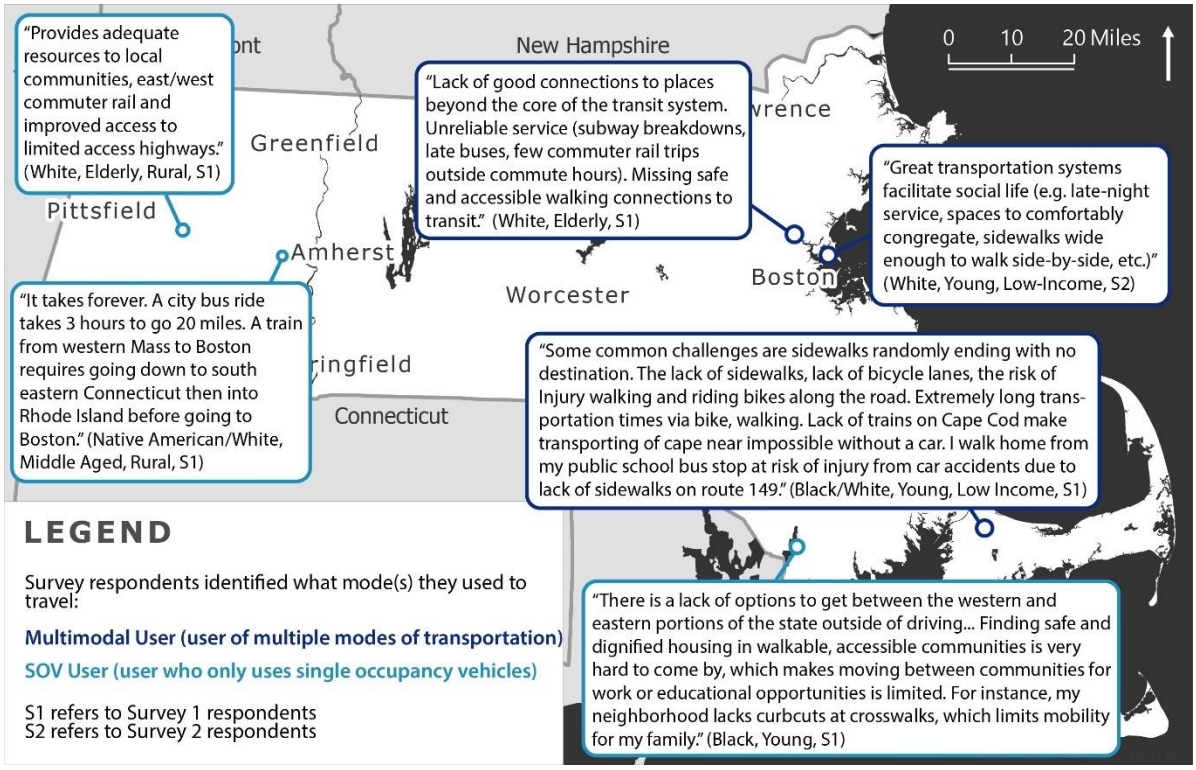
Figure 3.16 Priorities for Transit Improvements by Equity Group


Imagine that you have 100 tokens to spend on related transportation improvements. How would you distribute them among the following priorities?
More frequent bus service
More passenger rail options
More frequent commuter rail service
More frequent subway service
Community shuttle services that would get people to, from, and around major activity centers
Encouragement of carpooling and ridesharing
Other (Please specify)
0
5
10
15
20
25
30
Average (All Respondents)
Rural (n=36)
POC (n=751)
Language (n=29)
Have a Disability (n=310)
65 and Older (n=295)
Low Income (n=309)

N=2,453
Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

Figure 3.17 offers additional geographic context to identify overlapping priorities, displaying what destination connectivity means statewide. Overwhelmingly, respondents in both urban and rural areas envision the transportation system as a tool to facilitate greater social, economic, and educational outcomes. In parallel, survey respondents in western and coastal Massachusetts spoke to the inadequacy of transportation options, long commutes, and deficient infrastructure that further limits safe travel.

Figure 3.17 Statewide Surveying Results—Destination Connectivity Visions and Challenges


"Provides adequate resources to local communities, east/west commuter rail and improved access to limited access highways." (White, Elderly, Rural, S1)
New Hampshire
0 10 20 Miles
"Lack of good connections to places beyond the core of the transit system. Unreliable service (subway breakdowns, late buses, few commuter rail trips outside commute hours). Missing safe and accessible walking connections to transit." (White, Elderly, S1)
Greenfield
Pittsfield
Amherst
Worcester
Boston
"Great transportation systems facilitate social life (e.g. late-night service, spaces to comfortably congregate, sidewalks wide enough to walk side-by-side, etc.)" (White, Young, Low-Income, S2)
"It takes forever. A city bus ride takes 3 hours to go 20 miles. A train from western Mass to Boston requires going down to south eastern Connecticut then into Rhode Island before going to Boston." (Native American/White, Middle Aged, Rural, S1)
"Some common challenges are sidewalks randomly ending with no destination. The lack of sidewalks, lack of bicycle lanes, the risk of Injury walking and riding bikes along the road. Extremely long transportation times via bike, walking. Lack of trains on Cape Cod make transporting of cape near impossible without a car. I walk home from my public school bus stop at risk of injury from car accidents due to lack of sidewalks on route 149." (Black/White, Young, Low Income, S1)
Connecticut
LEGEND
Survey respondents identified what mode(s) they used to travel:
Multimodal User (user of multiple modes of transportation)
SOV User (user who only uses single occupancy vehicles)
S1 refers to Survey 1 respondents
S2 refers to Survey 2 respondents
"There is a lack of options to get between the western and eastern portions of the state outside of driving... Finding safe and dignified housing in walkable, accessible communities is very hard to come by, which makes moving between communities for work or educational opportunities is limited. For instance, my neighborhood lacks curbcuts at crosswalks, which limits mobility for my family." (Black, Young, S1)

Existing Challenges: What Hinders Destination Connectivity?

Given the significant differences in transportation needs and transportation choices across Massachusetts, destination connectivity has distinct meanings depending on who is asked. However, several destination connectivity themes summarize common challenges: **access to opportunity, multimodal mobility, transit connectivity,** and **geographic equity.**

Residents acknowledge the value that transportation brings on both a regional scale and personal level. Residents want connectivity to destinations, including first- and last-mile connections to and from transit and improved transportation options. Residents also express challenges commuting or traveling from the western to eastern sides of the state and recognize the importance of connectivity via non-SOV modes. These key themes, as well as additional survey content, provided context for existing challenges:

- **Lack of contiguous sidewalks and protected bike lanes** prevent residents from using active transportation. Residents are fearful of trying new modes or exploring multimodal options because of aggressive driving, poor connectivity between modes, and inadequate infrastructure. When residents express a desire for "seamless connections," they oftentimes indicate a desire to travel without a car.
- Residents associate **state of good repair** with destination connectivity. A lack of protected and well-maintained bike lanes and sidewalks, for example, leads to dysfunction and gaps in the transportation system.
- There is a **lack of network connectivity in rural areas,** particularly related to public transportation including Commuter Rail, trains, and buses. Currently, there is insufficient connectivity and coverage in much of western and coastal Massachusetts. Users describe a fragmented system that prioritizes urban areas like Boston while leaving rural and suburban areas out of the picture.

Destination Connectivity—Access to Opportunity

"We run a small business here in Berkshire County. If we had fast rail transportation to New York City, we would be able to grow our business, hire more employees, and contribute to the economic growth of Berkshire County." (2018 State Rail Plan)

Destination Connectivity—Multimodal Mobility

"I grew up in a predominantly Black neighborhood in Boston where people biked, walked, or took the T. People in predominantly black neighborhoods are neglected when it comes to fulfilling all their needs. With no car, they have to rely on the T to get what they want/need and if the T doesn't access places where people can get those resources, it is hard to supply their own livelihood." (Black Interviewee, *Beyond Mobility* Focus Group)

Destination Connectivity—Transit Connectivity

"We need frequent, interconnected systems that connect rural areas as well as urban ones. We need micro transit connections to bring people to the larger transit system." (Meeting-in-a-Box participant)

- The **lack of first- and last-mile connections to transit** are a central problem across the Commonwealth. Residents recognize the value of transportation, yet are subjected to limited opportunities when there are no connections, or infrequent and unreliable connections, to places with more opportunity. Over half of all Meeting-in-a-Box participants referenced the importance of microtransit and/or first- and last-mile connections to fixed route transit.

- Equitable access to transportation is a key element of a connected system. Residents acknowledge that, often, wealthy neighborhoods or downtowns are prioritized, leaving residents in other communities feeling disinvested in and disconnected. This **lack of geographic equity leads to higher fares, increased travel time, and large gaps** in the transportation network. Ultimately, this leads to lost opportunities and low levels of destination connectivity.

Destination Connectivity—Geographic Equity

"Equitable access to the Hilltown communities of Massachusetts. The need for a train/reliable way to be connected to the rest of Mass… has yet to be appropriately addressed." (White, Young, Low- Income, Rural, SOV Driver)

Destination Connectivity—Car-Free Travel Options

"For low-income residents without a car in Bourne, you end up relying on Uber for needed trips - which becomes financially burdensome. But there are no other options, you're stranded here [without a car]." (Herring Pond Wampanoag Tribal Member)

- Stakeholders in the Cape Cod area emphasized the **seasonality of the Cape Flyer service** as a large hinderance to being able to travel to other parts of the state. Residents on the Cape proposed running ferry service from areas such as New Bedford to help connect residents to where they need to go when construction is occurring on Cape Cod Bridges and other key infrastructure in the area, like the increase in ferry service when the Sumner Tunnel was under construction in the Boston area.

Vision for a More Connected Transportation System

Residents see increased destination connectivity as a way to improve quality of life in Massachusetts. Common and consistent visions regarding the need to improve and expand system integration include:

- **Enabling car-light or car-free lifestyles and enhancing modal connectivity** will not only help the environment but also boost public health, save roadway maintenance costs, and expand options for those who may be unable to drive or afford a vehicle.

- **Expanding infrastructure and access to public transportation** is necessary, including Commuter Rail, trains, and buses in areas with insufficient connectivity and coverage outside of downtown Boston. Within Boston, there is a need for continuous and wide sidewalks to encourage more walking and prioritize safety for pedestrians and commuters.

- **Increasing transit operating hours** to later in the evening and on weekends both within and outside of Boston. More efforts are needed to ensure public transit service is equitably planned and distributed.
- **Extending transportation services and modal options** to reach essential services, key destinations, and popular social spots. This will allow people to conveniently meet their daily needs and increase their social networks, while also expanding options of where residents can live and age affordably.
- **Prioritizing investment in rural, low-income, and or transit-light areas** will create a more comprehensive system that diminishes travel time, fare hikes, and system gaps while ensuring all residents feel connected.
- **Building redundancy and safety into the transportation system** will enable greater levels of comfort and confidence in the transportation system by ensuring there are multiple pathways and modal options between origins and destinations.

3.6 Resiliency

The impacts of climate change present a significant and evolving risk to the safety, reliability, and accessibility of transportation systems, including infrastructure conditions and daily operations. Disruptions in any part of the system may cause recurring and frequent delays or roadway and transit service shutdowns. These disruptions will lead to longer commutes while having rippling socioeconomic impacts (e.g., lost money, time, and opportunity) across multiple cities, neighborhoods, and people, hitting marginalized communities the hardest. Building, operating, and maintaining a resilient transportation system is essential for positive economic, social, and mobility outcomes in Massachusetts.

The definition of resilience is multifaceted and context dependent. A resilient transportation system can adapt to changing conditions over time, such as rising sea levels, higher tides, hotter temperatures, and extreme precipitation and winter storms. Transportation infrastructure may be designed to mitigate or lessen the impacts of disrupting events.

Resilience is also the capability for a transportation system to withstand and recover quickly from a disruption, such as a major equipment breakdown—crucial from an operational perspective. How rapidly a transportation system restores equitable access to services will affect users' ability to securely, comfortably, and effectively travel to their destinations.

These multifaceted components of resilience were reflected in *Beyond Mobility* public engagement feedback. Respondents described not only the various aspects of a resilient transportation network described above but also components that positively contribute to an individual's resilience (i.e., their ability to maintain their mobility despite the stresses and shocks to the environment around them). A non-resilient transportation system can negatively impact users and their well-being. For example, a non-resilient system may manifest as scorching bus stops without covered bus shelters on hot days or an inundated roadway that causes delays, inconveniences, and safety issues.

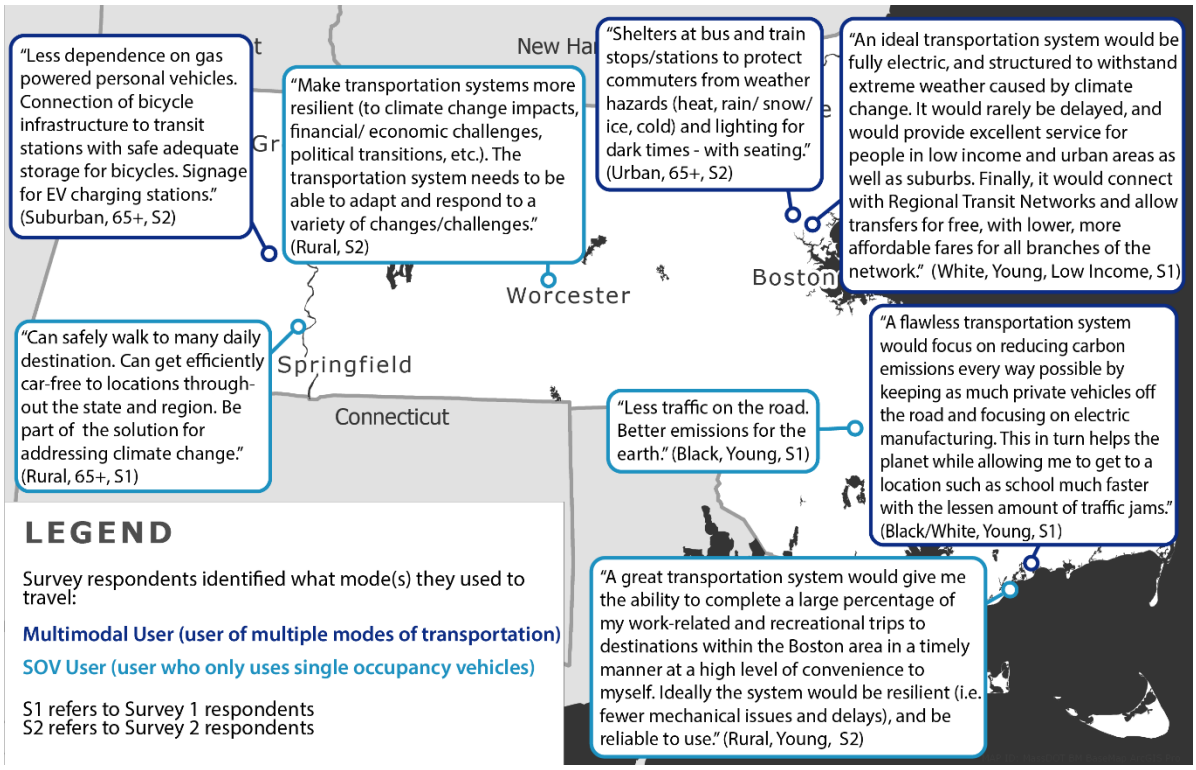
Who is Most Concerned about Resiliency?

As a part of the *Beyond Mobility* Phase I Vision, Values, & Needs Survey, respondents prioritized aspects of the transportation system to change or improve in their lifetime. A resilient transportation system supports many of the top priorities identified by survey respondents (Figure 3.18). For example, a resilient transportation system has network and mode redundancy to ensure connectivity and equitable transportation choices, even when one link is disrupted. It also means robust and adaptable infrastructure in good condition that provides a reliable and safe network for road users. Likewise, the resiliency of the system determines how quickly a roadway can be reopened to full capacity after a crash or heavy storm. Resiliency is the Priority Area that embodies elements of all others (safety, connectivity, travel experience, reliability, and clean transportation), unearthing the real priority amongst residents, which is to travel in spite of disruptions.

Environmental impact was ranked as one of the most pressing priorities, with 38 percent of all *Beyond Mobility* Phase I Vision, Values, & Needs Survey respondents and 34 percent of equity group respondents ranking it within the top four concerns. The essential importance of environmental impacts cuts across generations: 46 percent of respondents who selected environmental impact as a top priority were either under the age of 34 or over the age of 65. This is visualized in Figure 3.18, in which the most telling statements came from Massachusetts' youngest and oldest residents.

In *Beyond Mobility*'s Phase II Priorities & Tradeoffs Survey, residents were asked to name qualities of a "flawless" transportation system; one-third of write-in responses expressed an environmentally focused answer. Figure 3.18 also shares examples of how Massachusetts residents view the transportation system as a conduit for achieving environmental goals. The quotes illustrate the pursuit of more resilient transportation despite extreme weather events, common weather hazards, and other unpredictable disruptions.

Figure 3.18 Visions of Resiliency of Respondents

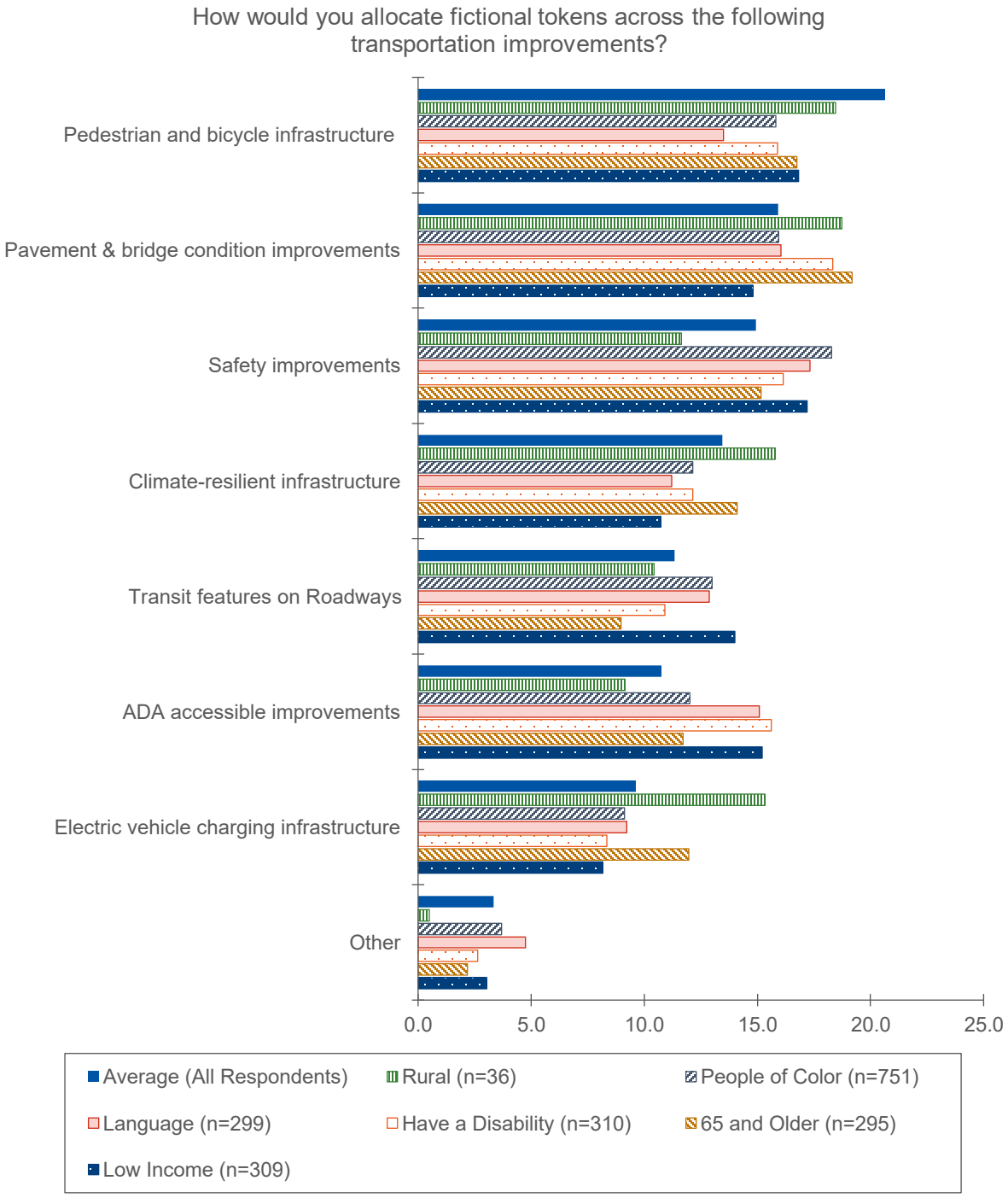

"Less dependence on gas powered personal vehicles. Connection of bicycle infrastructure to transit stations with safe adequate storage for bicycles. Signage for EV charging stations." (Suburban, 65+, S2)
"Make transportation systems more resilient (to climate change impacts, financial/ economic challenges, political transitions, etc.). The transportation system needs to be able to adapt and respond to a variety of changes/challenges." (Rural, S2)
"Shelters at bus and train stops/stations to protect commuters from weather hazards (heat, rain/ snow/ ice, cold) and lighting for dark times - with seating." (Urban, 65+, S2)
"An ideal transportation system would be fully electric, and structured to withstand extreme weather caused by climate change. It would rarely be delayed, and would provide excellent service for people in low income and urban areas as well as suburbs. Finally, it would connect with Regional Transit Networks and allow transfers for free, with lower, more affordable fares for all branches of the network." (White, Young, Low Income, S1)
"Can safely walk to many daily destination. Can get efficiently car-free to locations through-out the state and region. Be part of the solution for addressing climate change." (Rural, 65+, S1)
"Less traffic on the road. Better emissions for the earth." (Black, Young, S1)
"A flawless transportation system would focus on reducing carbon emissions every way possible by keeping as much private vehicles off the road and focusing on electric manufacturing. This in turn helps the planet while allowing me to get to a location such as school much faster with the lessen amount of traffic jams." (Black/White, Young, S1)
"A great transportation system would give me the ability to complete a large percentage of my work-related and recreational trips to destinations within the Boston area in a timely manner at a high level of convenience to myself. Ideally the system would be resilient (i.e. fewer mechanical issues and delays), and be reliable to use." (Rural, Young, S2)
Worcester
Springfield
Connecticut
Boston
LEGEND
Survey respondents identified what mode(s) they used to travel:
Multimodal User (user of multiple modes of transportation)
SOV User (user who only uses single occupancy vehicles)
S1 refers to Survey 1 respondents
S2 refers to Survey 2 respondents

Existing Challenges: What Hinders Resiliency?

For the *Beyond Mobility* Phase II Priorities & Tradeoffs Survey, respondents allocated 100 tokens to various transportation system improvements, many centering on resiliency (Figure 3.19). Respondents' investment choices illuminate the challenges residents face currently and where they see obstacles to a more resilient system.

All respondents invested significantly in pedestrian and bicycle infrastructure and pavement and bridge condition improvements, which indirectly support a resilient transportation network through increased connectivity, redundancy, and state of good repair. Climate-resilient infrastructure was the fourth-ranked improvement for all respondents, although rural and older (aged 65 and above) respondents invested more in resilient infrastructure than the average respondent. Respondents from rural communities allocated greater than 1.5 times more tokens for electric vehicle charging infrastructure than any other group. Low-income earners, non-native English speakers, and people of color were more likely to prioritize transit features on roadways and safety improvements.

Figure 3.19 Priority Roadway Improvements by Equity Group



N=2,543
Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

Within the “other” category, many respondents wrote answers about resilience challenges, such as “heat mitigation of roads and streets,” noting the urban heat island effect and pavement softening; “solar along public highways,” “electric buses,” and “hydrogen fuel,” perceiving a need for non-fossil fuel sources; and “wildlife crossings,” observing how transportation infrastructure can be detrimental to biodiversity and wildlife connectivity.

Many common transportation challenges Massachusetts residents face are exacerbated by the effects of climate change, extreme weather, and poor system resiliency. Quotes from respondents highlight some of these challenges below:

- **Unreliability, lack of connectivity, and inadequate transit services spurred by maintenance delays and inefficient land use patterns** may be aggravated by climate-related infrastructure and service disruptions. Residents feel the current transportation system is outdated, with maintenance often going uncommunicated or taking too long.
- **Concentrations of air and noise pollution caused by transportation and congestion** lead to an inequitable distribution of poor health outcomes and diminished neighborhood well-being, harming a community’s ability to be resilient and thrive. Residents convey their worries about inequitable outcomes for environmentally burdened communities.
- **Climate anxieties about personal and system-level climate change contributions** are increasing**.** Residents acknowledge their role in contributing to and remediating climate change, while also recognizing the role that the transportation system and other industries play.

Resiliency

“Allows me to get from point A to B in a fast, reliable, safe, and efficient manner. A system that doesn’t disrupt/segregate neighborhoods. A system that is carbon neutral and doesn’t contribute to climate change. Integration with smarter technology. Fast efficient repairs and service to infrastructure.” *(Urban, White, Young)*

Resiliency

“The neighborhood and city center on the other side of the huge highway that creates all kinds of noise and air pollution and cuts my neighborhood off and makes it dangerous and inconvenient to get to by foot or bike even though it is just blocks away.” (*Multimodal User, Black/White, Middle Aged)*

Resiliency

*“*Get us to where we need to, affordably, without polluting the air we breathe or increasing carbon emissions in the atmosphere thus accelerating climate change; meeting the needs of those that don't have other alternatives for transport but the public system.” (*Rural, Vehicle Owner, Middle Aged)*

- **Unaffordability and inequity in services** mean that, for some, personal vehicles are an expensive or unobtainable transportation option. Some households are dependent on transit, walking, or bicycling, yet there is inequitable access to safe and comfortable active transportation networks or timely and dependable transit services. Residents with limited transportation options often experience disproportionate transportation costs, in terms of time, money, and health outcomes.

Resiliency

"Prioritizes multi-modal transportation, aims at reducing driving as primary mode of transportation, recognizes and acts on the urgency of stalling climate change." (*Multimodal User, Suburban, White, Young)*

- **People fear that climate change impacts will disable connections to people, places, and opportunities.** A resilient transportation system provides safe, reliable, and equitable travel options across a robust and well-connected network. Conversely, if the transportation system is not resilient, communities may be isolated physically, socially, and economically by climate disruptions. Residents are fearful of service shutdowns caused by flooding, sea level rise, and extreme heat.

Resiliency

"My priority would be to think LONG TERM. Much of our public transit in the Boston area could be affected by sea level rise and storm surge flooding. We have to make sure that new infrastructure doesn't flood." (*Meeting-in a-Box participant)*

- **Poor-quality roadways and reliance on personal motor vehicles** limit clean and climate-friendly transportation options**.** A perceived lack of robust, safe, and reliable options for transit, rail, and active transportation force people to drive personal vehicles, contributing to carbon emissions. System reliability is further threatened by infrastructure in poor condition or lacking capacity to handle 21st century hazards.

Resiliency

"An ideal transportation system has cars in the equation but it is NOT centered around the private vehicle, and promotes sustainable options such as car sharing. The Commonwealth benefits from a fairly extensive heavy rail network that is rather unexploited, with slow diesel trains, running sparsely through the day. The demand is there for expanding rapid transit and buses, to enhance grade-separate bike lanes to solve the last-mile problem, and to pacify avenues that currently resemble freeways." (*Multimodal User, Urban, White, Young)*

- **Adequate drainage** on the Commonwealth's highways was a problem highlighted by freight transportation providers and residents. Heavy rain that led to flooding in the summer and fall of 2023 exposed the magnitude of these problems when many roads throughout western and north central Massachusetts were forced to close and residents evacuated.

Vision for a More Resilient Transportation System

Beyond Mobility survey respondents shared a vision for a more robust transportation system, one that leverages transportation as a way of developing a more resilient Massachusetts. These visions include:

- **A modern, cleaner, and more efficient transportation system** that focuses on reliably moving users despite disruptions from weather, construction, or delays. This system also reduces noise and air pollution by investing in zero-emission transit vehicles and providing increased frequency and speed of rail and bus services to match demand.

- Residents wish for the **prioritization of multimodal options including creating a more inviting environment for non-motorized travelers.** This includes universal and well-maintained bicycle and pedestrian infrastructure that is densely connected, protects from vehicles, and provides cover from sun and precipitation. Tree-lined streets, public toilets, and benches may boost comfort, provide refuge, and mitigate urban heat island effects.

- **Investment in climate preparedness and enhanced financial and social stewardship** are essential**.** Transportation agencies prioritizing investments today in adaptive and well-maintained infrastructure may save money, resources, and time in the future or during a disaster.

- There is **increased motivation to fight environmental injustice and improve the quality of life for all residents.** Investments in active transportation, public transportation, emissions and noise pollution reductions, and electrification may have great benefits for all Massachusetts residents, particularly residents who live in historically marginalized communities.

3.7 Travel Experience

Each time someone uses the transportation system, that trip is characterized by a set of impressions around comfort, usability, and ease. MassDOT conceives of this “travel experience” as similar to the idea of “user experience”; that is, it represents how someone who uses the transportation system interacts with the system or service. This term encompasses those features that make up a user’s impression and judgments.

These experiences differ depending on the environment in which the trip is taking place. As part of the *Beyond Mobility* public surveys and outreach process, residents across Massachusetts provided thousands of responses that offer insights into their transportation journeys. For many people, a high-quality travel experience centers on the core functions of a transportation system; people expressed a desire for travel that is low-stress and comfortable, which often entailed some combination of consistency, system ease, personal safety, and asset quality.

Who is Most Concerned about Travel Experience?

Across statewide survey efforts, respondents often identified issues related to their overall travel experience as top priorities for the transportation system. Around 33 percent of *Beyond Mobility* Phase I Vision, Values, & Needs Survey respondents noted that they valued “user experience,” representing the highest average of all respondents over any other category.

A focus on the user's travel experience was particularly clear among respondents who identify as part of an equity population (Table 3.1). Individuals who identify as part of an equity population often rely on public transportation or own just one household vehicle, which may in part explain this emphasis. Table 3.1 highlights the qualities of the travel experience most important to various demographic groups. These characteristics were identified through qualitative coding of survey and focus group responses that asked respondents to describe components of their ideal future transportation system.

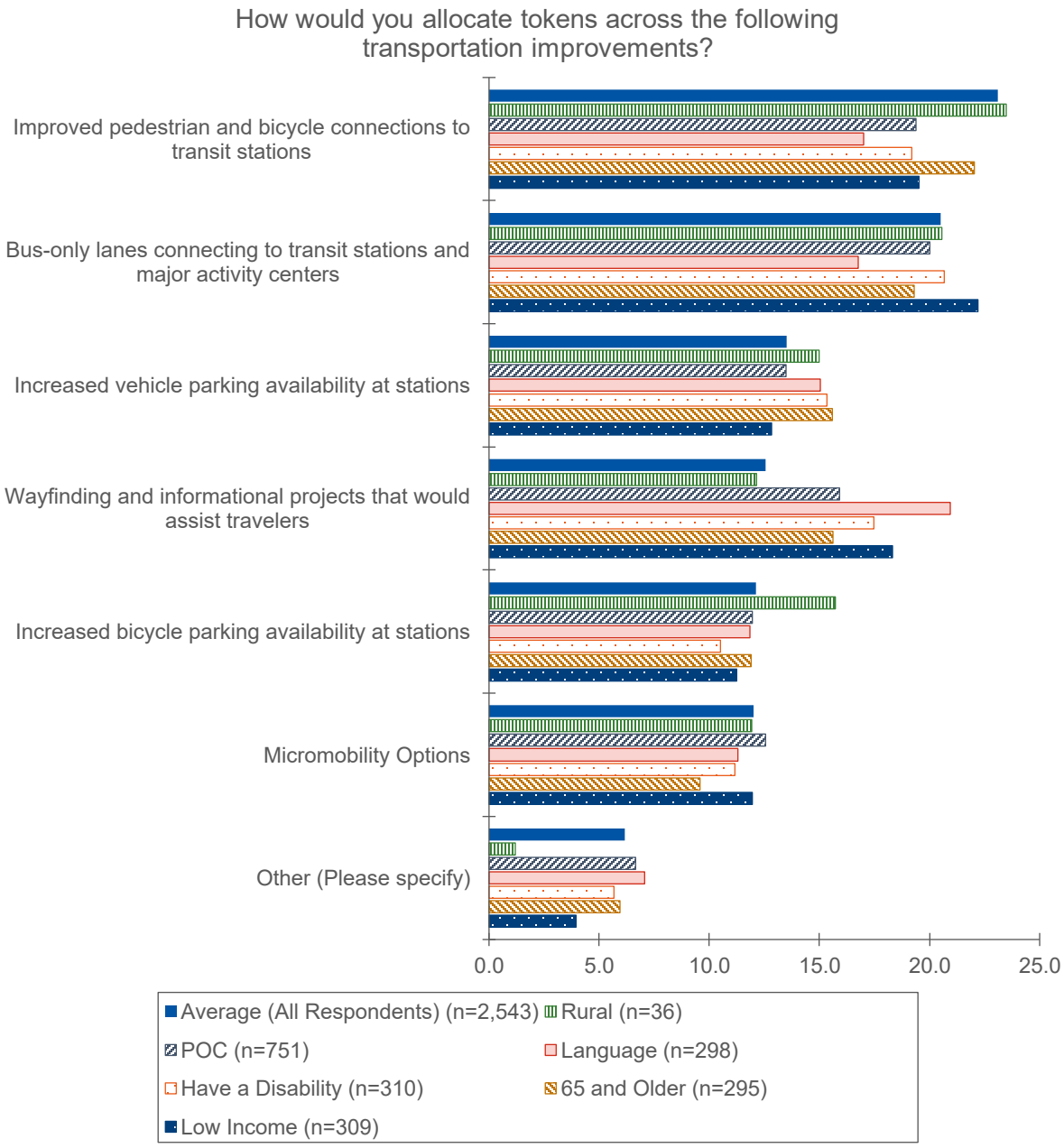
Table 3.1 Definition of Travel Experience by Community Group

Low Income	Older (Aged 65 and Over)	People of Color	Rural Residents
Speedy, accessible, affordable, social	Clean, comfortable, modern, speedy	Low-stress, convenient, comfortable, safe	Comfortable, accessible, affordable, clean

Sources: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022, Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022, Beyond Mobility Phase I Focus Groups, and Interviews, 2022.

As indicated in Figure 3.20, lower-income respondents, respondents with disabilities, and limited English proficient (LEP) respondents prioritized wayfinding and traveler assistance projects in a survey question that asked respondents to rank various transportation agency activities. Notably, legibility of the system was the top response from LEP respondents and the second highest response for lower-income respondents, indicating that navigating and understanding the current system remains opaque for certain groups.

Figure 3.20 Transit Supportive Improvement Priorities by Equity Group

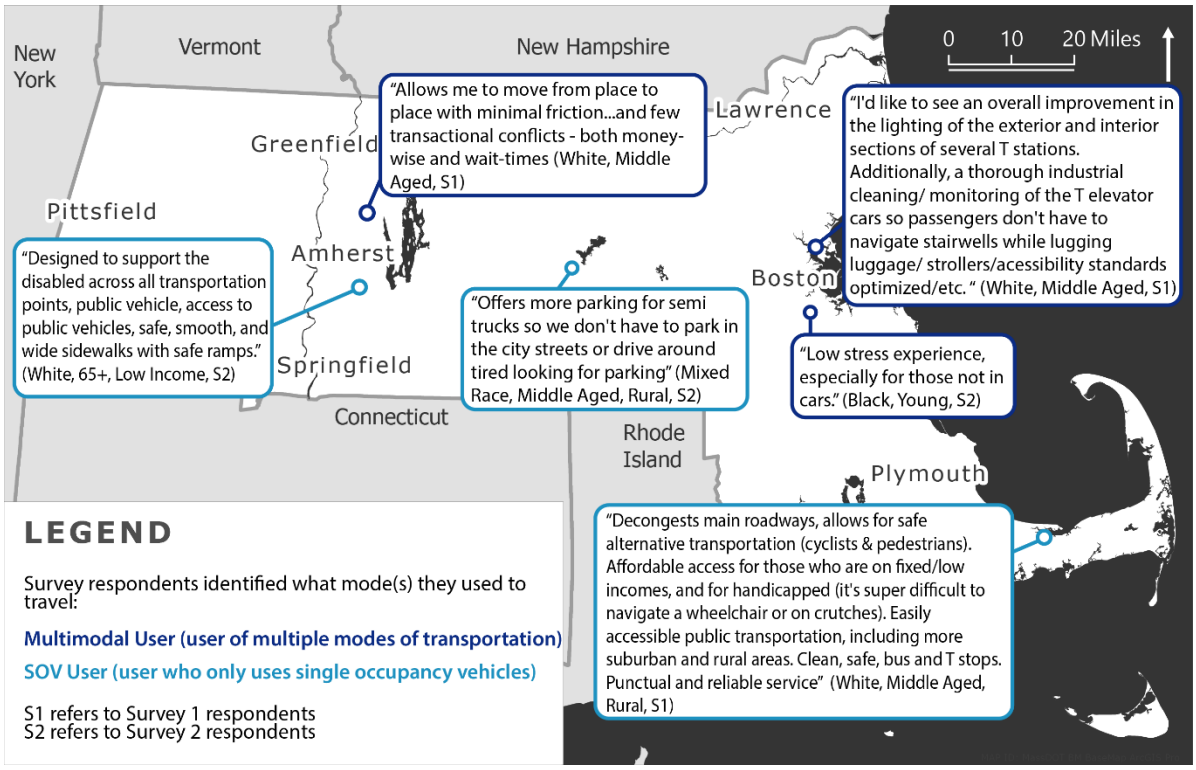


Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

Figure 3.21 offers examples of public feedback on travel experience across the Commonwealth. Respondents in urban areas tend to emphasize stressful commutes, outdated facilities, and unsafe multimodal options. Residents in rural and suburban areas were more concerned with poor roadway conditions, lack of affordable and direct transit services, and feelings of inaccessibility. The map also highlights the user mode, which is a particularly relevant characteristic in this Priority Area given the difference in travel experience in a vehicle versus transit.

Additionally, during Phase III of public engagement, members of the Herring Pond Wampanoag Tribe underscored the importance of indigenous cultural and historical assets and the effect that construction has on these assets. For instance, construction often encourages cut-through traffic, which puts wear and tear on culturally significant pathways, as does the siting of new infrastructure on these pathways. Tribal members encouraged MassDOT and other state agencies to consider indigenous cultural assets in their project development process, similar to environmental assessments or survey reviews.

Figure 3.21 Future Visions of Enhanced Travel Experiences


New York
Vermont
New Hampshire
0 10 20 Miles
Greenfield
Lawrence
Pittsfield
Amherst
Boston
Springfield
Connecticut
Rhode Island
Plymouth
"Allows me to move from place to place with minimal friction...and few transactional conflicts - both money-wise and wait-times (White, Middle Aged, S1)
"I'd like to see an overall improvement in the lighting of the exterior and interior sections of several T stations. Additionally, a thorough industrial cleaning/ monitoring of the T elevator cars so passengers don't have to navigate stairwells while lugging luggage/ strollers/acessibility standards optimized/etc. " (White, Middle Aged, S1)
"Designed to support the disabled across all transportation points, public vehicle, access to public vehicles, safe, smooth, and wide sidewalks with safe ramps." (White, 65+, Low Income, S2)
"Offers more parking for semi trucks so we don't have to park in the city streets or drive around tired looking for parking" (Mixed Race, Middle Aged, Rural, S2)
"Low stress experience, especially for those not in cars." (Black, Young, S2)
"Decongests main roadways, allows for safe alternative transportation (cyclists & pedestrians). Affordable access for those who are on fixed/low incomes, and for handicapped (it's super difficult to navigate a wheelchair or on crutches). Easily accessible public transportation, including more suburban and rural areas. Clean, safe, bus and T stops. Punctual and reliable service" (White, Middle Aged, Rural, S1)
LEGEND
Survey respondents identified what mode(s) they used to travel:
Multimodal User (user of multiple modes of transportation)
SOV User (user who only uses single occupancy vehicles)
S1 refers to Survey 1 respondents
S2 refers to Survey 2 respondents

Existing Challenges: What Hinders Travel Experience?

Given the significant differences in mobility needs, transportation options, and transportation modes across Massachusetts, a high-quality travel experience may mean different things to different people. At the same time, there are some consistent threads across how people view travel experience despite coming from a range of backgrounds. Figure 3.22 highlights several key aspects that make up a high-quality travel experience: **mode choice, affordability, accessibility,** and **improved infrastructure.**

Figure 3.22 Travel Experience Public Engagement Themes

MODE CHOICE	AFFORDABILITY	ACCESSIBILITY	IMPROVED INFRASTRUCTURE
"Alternative methods for the same route, in case your preferred method is halted by weather repairs, etc." (White, 65+, Suburban) "Disincentivizing car travel. Reliable T timetables and trains..." (Asian/White, Young, Urban) "Lack of frequency makes transit connections difficult, hard to get outside of the city, difficult to connect between modes even on the same transit system, lack of micro mobility options compared to other states." (White, Young, Low-Income, Urban)	"I have to drive everywhere. Traffic is awful, gas is expensive, car maintenance is expensive...Driving increases my exposure to cops, which is very unpleasant." (White, Young, Urban) "When there is snow, a $10 Uber turns into $30. This can be very stressful. It would be nice to have something in place, like money for Uber, if you do not have your own vehicle." (1-on-1 interview, Hatian-Creole)	"Outdated technology, unreliable, unsanitary and unsafe." (Native American, Middle Aged, Suburban) "Need to connect small community shuttle services with larger community bus services so smaller town folk can get to hospitals, schools, businesses, etc." (Meeting-in-a-Box) "EVERY bus accessible - not all buses are physically accessible and is very inconvenient... More handicap seating for buses with a hospital stop." (Focus 40)	"Coming from China, there is a huge gap toward public transit quality. I did not have to drive until I moved here. Our subway back home was more comprehensive and newer with safety doors." (1-on-1 interview, Mandarin) "The current freight options are antiquated, not cost effective and should be modernized..." (2018 *State Freight Plan*) "Start the planning from the pedestrian perspective." (Meeting-in-a-Box)

Source: Beyond Mobility Phase I Focus Groups & Interviews, 2022, Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022, Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022, Beyond Mobility Phase II Meeting-in-a-Box, and Massachusetts State Freight Plan, 2018.

Based on this and other public input, key points for MassDOT to consider include:

- **Ease of trip planning** is an important component of the travel experience. People want to be able to depend on transit service, which involves easily legible and up-to-date timetables, a low chance of service disruptions or "ghost buses,"[6] and the reliability of trip planning applications.

[6] A "ghost bus" is a trip that exists on a GPS-based information system (such as Google Maps) but is not actually served.

Technological modernizations, such as advancements in fare payment systems, also make it easier to access transit.

- The ability to **understand and navigate the system** despite a language barrier or unfamiliarity. There is a need for more embedded system accessibility, such as clear communication methods, wayfinding and signage improvements, and onsite staff. Additionally, there is an apparent lack of information between modes of travel and accessing real-time travel information without the use of cellular data or Wi-Fi.

- Outdated, unwelcoming, and neglected **infrastructure maintenance** on public transit, Commuter Rail, roadways, and sidewalks contribute to a negative travel experience. There is a need for upgraded asset infrastructure, including well-maintained roadways, reliable vehicles, and clean facilities. Unreliable snow removal and wintertime maintenance also impede multimodal travel and make travel experiences unpleasant and dangerous.

- People desire a greater sense of **personal safety**. This is particularly critical for those who have experienced harassment on public transit or negative altercations on roadways. For example, safety features may include track guardrails, onsite customer service staff, enhanced exterior and interior lighting, and cleaner facilities. On roadways, personal safety refers to better-designed intersections, crossings, and lane exits.

- More overall transportation options and **options that are affordable** would improve the travel experience for many people.

Vision for a Better Travel Experience

- **Travel information services and wayfinding** mechanisms are accurate and accessible on all modes of transportation. Access to information is a primary customer amenity. *Beyond Mobility* respondents envision enhanced communications technology to inform customers of delays and changes promptly. They envision a system with consistent and accurate traveler information**,** clear and intuitive signage on public transit, and visual elements such as lane markings in bike lanes and roadways. These features make the system more understandable for all. Participants picture a more inclusive transportation system through adequate multilingual travel information and information readily accessible without using a smartphone or electronic device, sharing details about travel delays, construction, or emergencies.

Travel Experience—Information

"Better bus customer amenities (shelters, real-time information, customer signage, accessible)." (Boston/South End, Transit Rider)

- An **easy, stress-free travel experience** is a key component for many. This includes being able to reach key destinations quickly and affordably, at any time of day, and without a car; if one mode is out of service, another can be easily substituted. Many wish for redundancy and overlapping of transportation services to be able to reach any point in the state—knowing that wherever and whenever they travel, there will be a way to return home.

- People seek **safety** on all system facilities and all modes. On public transit, during non-peak hours, near isolated bus stops and stations, or while on the system, *Beyond Mobility* participants envision the implementation of more safety features (on-site staff, enhanced lighting, track guardrails, and additional technology) to help riders in case of an emergency. Travelers imagine a seamless transportation system with features that mitigate threats to personal safety, such as separated bicycle lanes that do not suddenly merge with traffic lanes, smooth sidewalks, prioritized traffic signaling, and lower speed limits.

- **High-quality and well-maintained transportation infrastructure** allows all system users to easily access and use transportation across the Commonwealth. *Beyond Mobility* respondents envision a transportation system with features such as continuous sidewalks, curb ramps, accessible platforms, and well-maintained roadways. Maintenance improvements and system-wide cleanings would enhance the travel experience for all users.

Travel Experience—Safety and Maintenance

"It's an inconveniently long walk to get the T, and even then its the orange line which is questionably safe. When driving traffic is terrible, many intersections are terribly designed, long single lane exits that constantly back up, and road infrastructure that incentivizes poor behavior behind the wheel (i.e. never merging until the last possible second)." (Medford, SOV Driver)

"The quality of the roads throughout the state not only negatively impact time of travel, but the damage it does to vehicles and the risk for safety as well. Roads that have not been cared for, open up the potential for more crashes and could potentially cost towns/cities greater in the cost of repairs that just "band aid" the problem." (Dalton, SOV Driver)

4.0 Priority Areas

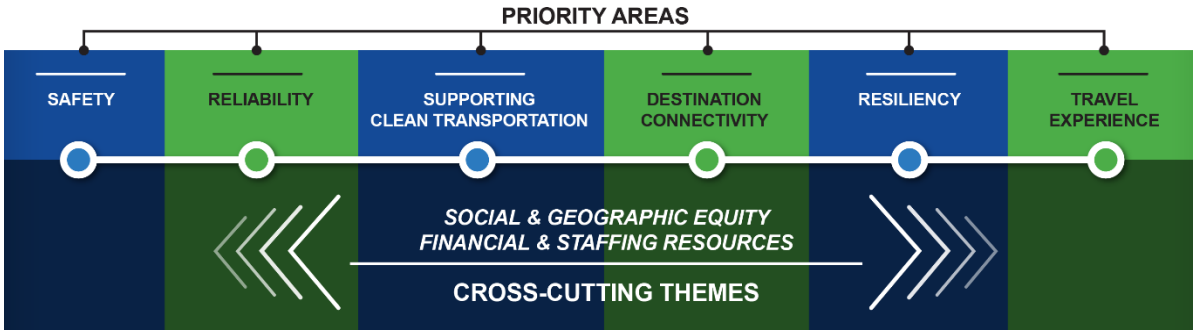
This chapter articulates the vision, values, and problem statements that define the six *Beyond Mobility* Priority Areas. The problem statements, based directly on public engagement feedback and needs assessment data) were used as the foundation for identifying subsequent *Beyond Mobility* Action Items for implementation in the areas of capital planning and programming, policy and program development, research, operations, and other categories across all MassDOT Divisions. These implementation Action Items, presented in Chapter 5, are designed to address the identified problems and make advancements toward each vision while remaining true to the values articulated.

The research and analysis performed as part of the *Beyond Mobility* planning process, including extensive public engagement, led to the identification of six key Priority Areas for MassDOT to focus on over the long term, including:

1. **Safety:** The ability of travelers to move throughout the transportation system free of physical or other harm.
2. **Reliability**: The consistency of transportation network conditions.
3. **Supporting Clean Transportation**: The transportation network's ability to accommodate low-emission and carbon-free travel modes.
4. **Destination Connectivity**: The degree to which travelers of any mode can access opportunities and the places they need or want to go.
5. **Resiliency**: The ability of the transportation network to anticipate, prepare for, and withstand the ongoing impacts of climate change.
6. **Travel Experience**: The conditions faced by travelers throughout the transportation network, including level of comfort and state of good repair.

Social and Geographic Equity and **Financial and Staffing Resources** are "cross-cutting themes" that connect across all six Priority Areas, as shown in Figure 4.1.

Figure 4.1 Beyond Mobility Priority Areas and Cross-Cutting Themes



Each Priority Area consists of MassDOT's vision for the future, values to uphold in pursuit of that vision, and Problem Statements describing today's challenges. The Priority Area visions and values are informed by and respond to the Problem Statements, which were initially developed from a review of data outputs drawn from public and stakeholder feedback, and a needs analysis of existing and future conditions, both site-specific and systemwide. Evidence supporting each Problem Statement is included in this section as "key facts." Data used to support the development of the key facts include:

- Public engagement findings from multilingual, multicultural focus groups and interviews, Meeting-in-a-Box focus groups with older adults and people with disabilities, a virtual public meeting, and two public surveys with a combined set of over 5,000 responses.
- Analysis performed as part of the *Beyond Mobility* Needs Assessment, which has involved applying "equity checks" to key transportation need indicators.
- Two vision and values workshops with key MassDOT and MBTA stakeholders.
- Interviews with key MassDOT stakeholders.
- A synthesis of public engagement findings from prior MassDOT plans.
- Previous planning and research efforts throughout Massachusetts.
- USDOT and Commonwealth of Massachusetts priority areas.

As noted, *Beyond Mobility* Action Items that respond to each Problem Statement and reflect Priority Area visions and values are introduced in Chapter 5.

Cross-Cutting Theme #1: Social & Geographic Equity

Equity can be challenging to define. Official definitions reported by Federal and State agencies are sometimes inconsistent with the data and measures used to evaluate the concept. The range of considerations included in any thorough study of equity exceeds any singular phrase or value.

For MassDOT transportation professionals, equity broadly refers to the critical need to ensure that people, communities, and lived experiences are prioritized in MassDOT's work, and to recognize that this has not always been the case, especially for specific groups of people and communities.

ENVIRONMENTAL JUSTICE COMMUNITIES
HAVE 18.4 TIMES
MORE ROAD MILES AT
HIGH RISK FOR PEDESTRIAN CRASHES
AND 13.7 TIMES
MORE ROADWAY MILES AT
HIGH RISK FOR BICYCLE CRASHES
THAN ALL OTHER COMMUNITIES

REGIONAL TRANSIT AUTHORITIES PROVIDE **LIMITED SERVICE IN THE EVENING AND ON WEEKENDS**, MAKING IT AN **UNRELIABLE OPTION** FOR SECOND AND THIRD-SHIFT WORKERS

This history has generated significant inconsistencies in how people in different communities are affected by and able to benefit from the Commonwealth's transportation system. There are myriad cases in which particular people and communities have been routinely and disproportionately burdened by the effects of unsafe roadway conditions, exposed to transportation-related greenhouse gas emissions, or left out of the benefits bestowed by transportation network improvements. Key facts and statistics that identify and highlight these equity issues are detailed throughout *Beyond Mobility*.

MassDOT is committed to advancing equity and mobility justice for all users of the transportation system; accordingly, social and geographic equity is more than a stand-alone Priority Area. Rather, it is a cross-cutting theme and systemic element in all of MassDOT's work. Accounting for equity must be a standard operating feature of every policy and strategy that MassDOT is involved in. Beginning with the planning and policy development process, MassDOT leaders and the entire workforce must engage community members and organizations in meaningful ways that allow for substantive understanding and conversations about the needs and challenges facing people as they move about the Commonwealth and the communities that the transportation system connects.

A commitment to equity means doing more than simply holding public meetings or town halls. It requires regularly going into communities to talk to people and stakeholders where they live, work, shop, and move about. It also means doing more than meeting minimum contracting thresholds for disadvantaged and women-owned businesses, and instead looking into MassDOT policies to seek out ways to encourage participation. Equity also means going beyond simple mapping exercises to understand potential project impacts to execute full-scale analyses into travel behaviors, access to critical destinations, and public health and environmental impacts.

Beyond Mobility takes equity and the social impact of MassDOT's work very seriously. A thorough Public Engagement Plan was developed as part of the Plan, which prioritizes historically underserved communities, such as non-English speakers, lower-income residents, tribal organizations, and youth. Through the planning process, MassDOT activated street teams, held multicultural and multilingual focus groups and interviews, launched two public surveys with over 3,600 responses, held stakeholder focus groups and visioning workshops, and deployed innovative strategies like Meeting-in-a-Box interactions to ensure engagement and representation from a wide range of stakeholders. A summary of the public outreach findings is included in Chapter 3.

ACROSS THE STATE, A TOTAL OF **1,530 AFFORDABLE HOUSING UNITS** ARE EXPOSED TO **COASTAL FLOODING RISKS**

Problem Statements and key facts with data analysis results referencing Environmental Justice communities were developed using a data layer called "Regional Environmental Justice Plus" or "REJ+". These criteria extend the traditional definitions of Environmental Justice communities (areas with larger populations of low-income, limited English proficiency, and/or residents of color) and Title VI communities beyond race, ethnicity, and income to include others particularly vulnerable to changes in the transportation network, including people over the age of 65, people with disabilities,

and people without access to personal vehicles. Many of the problem statements and key facts that were compiled for *Beyond Mobility* can be found in the sections below within this chapter. Additional details about this approach analyzing equity are included in Chapter 2 and Appendix C.

Cross-Cutting Theme #2: Financial & Staffing Resources

In addition to social and geographic equity, the availability of financial and staffing resources underlies all MassDOT's work. Identifying the key challenges facing the transportation system and outlining MassDOT's vision for the future are important steps. However, in the absence of required staffing capacity and funding, these add up to little more than words on a page. To be successful, MassDOT must leverage and potentially seek out additional funding resources to ensure that ongoing maintenance needs are met and that appropriate system expansions and upgrades are realized. Additionally, MassDOT needs an expanded workforce and strong organizational structure to ensure resiliency and responsiveness to the recurring and sometimes unexpected challenges faced.

Financial Resources

As a public agency, MassDOT relies on funding provided through formula and discretionary means from both the State and Federal governments to follow through on agency goals. While not the only factor, the degree to which MassDOT can successfully meet the *Beyond Mobility* vision is directly reflective of the amount of money that is dedicated to various funding programs and the flexibility of how that funding can be used.

MASSACHUSETTS'
TRANSPORTATION REVENUES
ACROSS ALL SOURCES ARE
PROJECTED TO INCREASE
FROM $7.2 BILLION IN 2022 TO
$10.2 BILLION IN 2050

Most MassDOT funding is dedicated to specific purposes, including granular elements of the transportation network's capital infrastructure. However, during the development of *Beyond Mobility,* MassDOT staff have reported particularly insufficient Federal and State funding for rail and transit needs, which leads to funding shortfalls in areas required to maintain a consistent level of service on passenger and freight railways in the state. For example, the MBTA is under pressure to deliver new projects even as it struggles to maintain the system in a state of good repair, which would better facilitate reliability. It has therefore become important to document project types that enhance both operational efficiency and reliability.

Chapter 7 explores anticipated future resources in more detail. Also, with respect to funding, at the time of the development of *Beyond Mobility*, the Healy-Driscoll Administration announced the creation of a new Transportation Funding Task Force. This Task Force will be composed of public and private-sector leaders, representing communities of all sizes across Massachusetts, who will examine the state's transportation system and develop a toolkit that builds on the Beyond Mobility plan to document steps Massachusetts' RTAs face similar financial challenges, as well. needed to implement the next generation of transportation investments in Massachusetts.

Staffing Resources

Over 3,000 employees work at MassDOT, including but not limited to office and administrative workers, bus drivers, civil engineers, highway designers, skilled technicians, transportation planners, and laborers. MassDOT's greatest asset is its people, and as an organization, MassDOT should be structured in a way to fully leverage this resource. This includes establishing effective hiring practices as well as processes for knowledge sharing, transfer, and succession planning.

THE INFRASTRUCTURE INVESTMENT AND JOBS ACT PROVIDED $550 BILLION IN NEW TRANSPORTATION INFRASTRUCTURE FUNDING, INCLUDING A **40% INCREASE IN TRANSIT FUNDING**

In the development of *Beyond Mobility*, several challenges concerning MassDOT's current organizational capacity were identified. For example, staff attraction and retention are major challenges, especially given the extent of competition from the private sector for talent and the cost of living and housing in Massachusetts. Staffing constraints mean MassDOT is not able to fully execute its mission or position as the lead agency in the state on transportation issues. For example, despite frequent requests, there are limited resources for providing training and technical assistance to partner agencies and municipalities.

Additionally, although MassDOT and its partner agencies are faced with financial challenges and constraints related to funding flexibility, there has been an unprecedented infusion of Federal funding from the Federal *Bipartisan Infrastructure Law* (BIL), which passed in the fall of 2021. To be in a position to maximize the use of these funds, MassDOT will need to grow its workforce to ensure existing organizational capacity is in place in the proper areas to develop new projects and leverage new funding opportunities.

MassDOT's workforce will also need to adapt to emerging research, maintenance, and other needs around new transportation technologies. For example, decarbonization of transit will require new training for maintenance staff, and may require more zero-emission transit vehicles to provide the same amount of service. The Registry of Motor Vehicles (RMV) also recognizes the potential for major changes to the nature of its work in the future, including through e-licensure and its role in data quality and protection. The Highway Division is still studying the implications of automated vehicles on maintaining roadway safety and licensure/permitting. Finally, the use and application of novel technologies such as aerial unmanned aircraft and urban air mobility will require significant investment and resources, as well as buy-in across the agency.

The Aeronautics Division is implementing the use and application of novel technologies such as aerial unmanned aircraft and Advanced Air Mobility (AAM), including electric vertical takeoff and landing (eVTOL) aircraft that can alleviate traffic congestion, reduce greenhouse gas emissions, and substantially reduce travel time between rural communities and urban centers to improve commuting and access to key social services. This will require investment and human resources, as well as a comprehensive analysis on how these technologies complement existing transportation networks.

Priority Areas

The next six subsections describe the **Safety, Reliability, Supporting Clean Transportation, Destination Connectivity, Resiliency,** and **Travel Experience** Priority Areas in detail. Each Priority Area includes the following:

- **Vision statement:** A future-looking description of the progress and achievements MassDOT will make in each Priority Area.
- **Values statements:** The principles that MassDOT will uphold in pursuit of the stated vision.
- **Problem Statements:** Major issues, challenges, and obstacles that Massachusetts travelers presently face related to each Priority Area.
- **Key facts:** Statistics, outreach findings, and trends supporting Problem Statements.

This information serves as the basis for the Action Items (defined in Chapter 5), which describe in more detail the work MassDOT and its partner agencies must do to achieve the vision statements and address the problems described below. Chapter 6 contains performance measures that can evaluate progress toward system-level goals informed by the vision statements, values, problems, and key facts. Finally, Chapter 7 summarizes funding resources available over the plan horizon that can be leveraged and potentially re-prioritized to address these issues.

4.2 Safety

VISION

By 2050, Massachusetts will have made significant progress toward advancing a future without transportation-related serious injuries and fatalities and will have eliminated the disparity in crash rates between Environmental Justice communities and all other groups. Residents will experience no infrastructure-related safety risks when walking, bicycling, rolling, driving, and riding transit within any community in Massachusetts.

VALUES

- MassDOT is committed to addressing safety risks through a **human-centered lens and a Safe System Approach**.
- MassDOT is committed to moving toward a future with zero roadway fatalities and serious injuries statewide in line with the "**Vision Zero**" initiative.
- MassDOT is committed to helping realize **safer speeds** across the Commonwealth to prevent serious crashes.
- MassDOT is committed to promoting **transit safety** through coordinating with transit providers on safety initiatives, rail transit operations, capital project delivery, and other activities.

PROBLEM STATEMENTS

- Environmental Justice (EJ) Communities—areas with larger populations of low income, limited English proficiency, and/or residents of color—are disproportionately burdened by transportation-related injuries and deaths on roadways, particularly those involving pedestrians and people on bicycles.
- Massachusetts traffic fatalities and fatality rates rose between 2019 and 2022, but have since begun trending downward.
- Users of active transportation modes like pedestrians and cyclists often experience unsafe, low-comfort, and disconnected facilities, especially in Gateway Cities and rural areas.
- Residents perceive an unsafe environment on public transportation due to a combination of high-profile crashes and other safety events, as well as personal experience.
- There is limited safety-related knowledge or guidance on certain issue areas, like drivers' education in autonomous vehicles, the application of unmanned aerial systems for improved safety outcomes, or the impacts of limited cellular service on emergency responsiveness or real-time transit vehicle tracking.

41% **OF ALL PEDESTRIAN FATAL AND SERIOUS INJURY CRASHES** OCCUR WITHIN **300 FEET OF A BUS STOP**[10]	**136** **OUT OF THE TOP 200 STATEWIDE INTERSECTION CRASH LOCATIONS** ARE IN ENVIRONMENTAL JUSTICE COMMUNITIES[14]
56% **OF FATAL PEDESTRIAN CRASHES** TOOK PLACE IN ENVIRONMENTAL JUSTICE COMMUNITIES[8]	**142** **OUT OF THE TOP 200 STATEWIDE PEDESTRIAN CRASH LOCATIONS** ARE IN ENVIRONMENTAL JUSTICE COMMUNITIES[14]

Key Facts

PROBLEM STATEMENT 1: Environmental Justice (EJ) Communities—areas with larger populations of low income, limited English proficiency, and/or residents of color—are disproportionately burdened by transportation-related injuries and deaths on roadways, particularly those involving pedestrians and people on bicycles.
Between 2017 and 2019, Environmental Justice communities had 1.72 times more pedestrian crashes per capita, 7.08 times higher pedestrian crash cluster area per capita, and 1.25 times higher fatal/serious crash rate per capita than all other communities (Figure 4.2 and Figure 4.3).[7]
In 2022, 56 percent of fatal pedestrian crashes took place in Environmental Justice communities.[8]
Environmental Justice communities have 18.4 times more roadway miles at high risk for pedestrian crashes and 13.7 times more roadway miles at high risk for bicycle crashes than all other communities. Rural communities have 2.61 times higher percentage of roadway miles at high risk for lane departure crashes (Figure 4.4).[9]
Although less than six percent of all roadway lane miles in Massachusetts are within 300 feet of a bus stop, over 40 percent of all pedestrian fatal and serious injuries occur within 300 feet of a bus stop. In the MBTA catchment area, 50 percent of all pedestrian fatal and serious injuries occur within 300 feet of an MBTA bus stop, yet less than 16 percent of the lane miles in the MBTA catchment area are within 300 feet of a bus stop.[10]
From 2016 to 2020, Black (non-Hispanic) people experienced non-fatal pedestrian injury rates (12.7 hospital stays per 100,000 residents) at nearly three times the rate as white (non-Hispanic) people (4.6 hospital stays per 100,000 residents) and Hispanic people at nearly two times the rate (7.6 hospital stays per 100,000 residents).[11]

7 MassDOT Crash Inventory, GeoDOT, 2017–2019.
8 MassDOT Crash Inventory, GeoDOT, 2020–2022.
9 MassDOT Crash Inventory, Network Screening Risk Based, 2013–2017.
10 MassDOT Vulnerable Road User Safety Assessment, 2023. https://storymaps.arcgis.com/stories/8b36ed2f1f3749b7ac085c0ca5b8efa7.
11 MassDOT FFY 2023 Massachusetts Highway Safety Plan https://www.mass.gov/info-details/strategic-highway-safety-plan

PROBLEM STATEMENT 2: Massachusetts traffic fatalities and fatality rates rose between 2019 and 2022, but have since begun trending downward.
Crashes involving speeding, lane departures, older drivers, and impaired driving are leading to consistently higher traffic fatalities and serious injuries.[12] Crashes at intersections have consistently caused more serious injuries than crashes not at intersections.[13]
Approximately 68 percent of the top 200 statewide intersection crash locations and 71 percent of the top pedestrian crash locations are in Environmental Justice communities.[14]
Since 2017, 60 percent of fatalities along Massachusetts roadways took place on principal or minor arterials.[15]
Out of the 1,272 at-grade rail crossings in Massachusetts, 135 are “unprotected passive crossings,” meaning there are no lights or gates to indicate the rail crossing.[16]

PROBLEM STATEMENT 3: Users of active transportation modes, namely walking and bicycling, often experience unsafe, low-comfort, and disconnected facilities, especially in Gateway Cities and rural areas.
Residents perceive an unsafe environment for people walking, using wheelchairs, and bicycling, including concerns with aggressive drivers and lack of personal space and security. 47 percent of people who use bicycles and 40 percent of pedestrians expressed safety as an element to be improved in the transportation system.[17]
Non-motorist intersection crashes are over-represented on state-owned roadways. Between 2016 and 2020, 30 percent of pedestrian and 20 percent of bicyclist crashes at intersections occurred at state-owned intersections, despite only 14 percent of intersections being under state ownership.[18]
A recent MassINC poll reported that 34 percent of respondents felt ‘somewhat unsafe’ or ‘very unsafe’ when riding a bicycle in Massachusetts; just 9 percent of respondents indicated they felt ‘very safe’ on a bicycle. Those that felt somewhat or very unsafe reported that reckless or speeding drivers, drivers distracted by their phones, and lack of bike lanes on streets were the most frequent reasons why they felt this way.[19]

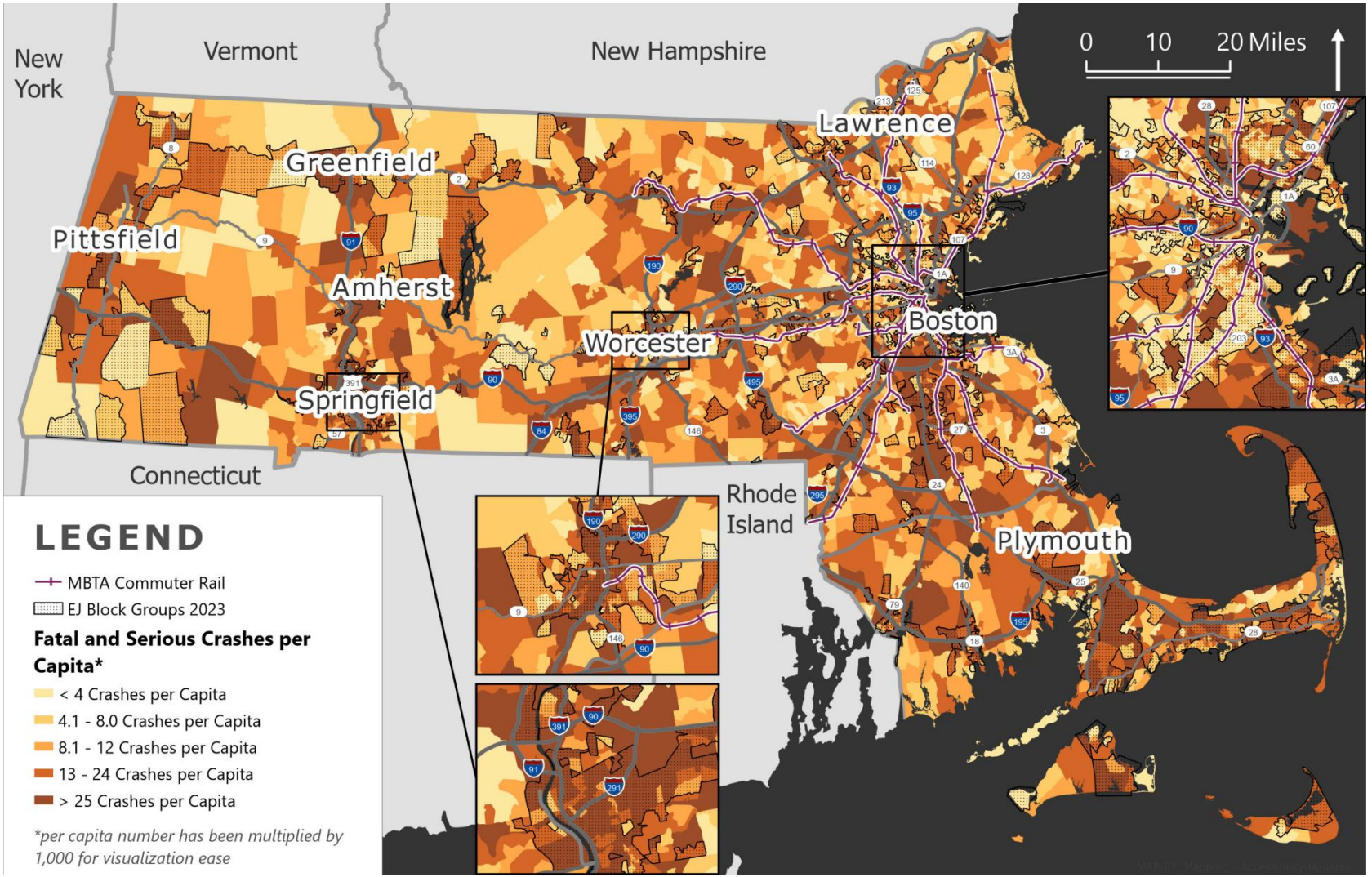
12 MassDOT FFY 2023 Massachusetts Highway Safety Plan https://www.mass.gov/doc/ffy-2023-massachusetts-highway-safetyplan/download#:~:text=The%20FFY%202023%20HSP%20program,within%20each%20respective%20program%20area.
13 *Ibid.*
14 *Ibid.*
15 *Ibid.*
16 MassDOT Massachusetts State Rail Plan, 2018, https://www.mass.gov/doc/final-state-rail-plan-spring-2018/download.
17 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.
18 MassDOT Vulnerable Road User Safety Assessment, 2023. https://storymaps.arcgis.com/stories/8b36ed2f1f3749b7ac085c0ca5b8efa7
19 MassINC Polling Group, 2023. https://static1.squarespace.com/static/5eb9fa2f8ac4df11937f6a49/t/65551a42e0ee542a089342e8/1700076100123/Topline+2023+11+Barr+Transportation.pdf.

PROBLEM STATEMENT 4: Residents perceive an unsafe environment on public transportation due to a combination of high-profile crashes and other safety events, as well as personal experience.
39 percent of all respondents and 41 percent of transit rider respondents indicated that they would like to see safety improved or changed within the transportation system.[20] Mandarin-speaking and Vietnamese-speaking focus group participants also commented on the rise of anti-Asian hate crimes on transit, which has led to perceived safety concerns and avoidance of using public transportation.[21]
Using data from the MBTA and RTA Public Transportation Agency Safety Plans published between 2019 and 2023, there were roughly 1.4 fatalities on all transit modes statewide per year. On average, there are approximately 586.4 injuries on all transit modes statewide per year, of which 584 occur on the MBTA and 2.4 occur at RTAs. On average, there are 177.7 safety events each year, of which 174 occur at the MBTA and 3.7 occur at the RTAs.[22]
In 2021 and 2022, the MBTA experienced several safety events resulting from deferred maintenance of assets in a poor state of repair, including six mainline derailments in 2021 (related to track, switches, and/or vehicle conditions); accidents on escalators and station facilities in poor condition; and safety events stemming from disabled trains, defective switches, and damaged equipment.[23]
A recent MassINC poll reported that respondents who indicated feeling unsafe or very unsafe on public transit (inclusive of the MBTA and RTAs) primarily had concerns about crime or violence, overcrowding, and old or broken vehicles, stations, or platforms.[24]

PROBLEM STATEMENT 5: There is limited safety-related knowledge or guidance on certain issue areas, like drivers' education in autonomous vehicles, the application of unmanned aerial systems for improved safety outcomes, or the impacts of limited cellular service on emergency responsiveness or real-time transit vehicle tracking.
More research is needed into the safety of new technologies (e.g., connected and autonomous vehicles).[25]
There is a need for more safety awareness and education, including a need for sharing information on topics like driver awareness of people on bicycles, speeding, and safe bicycle riding practices, among others.[26]
Inconsistent cellular service in rural areas results in slow emergency response times and more severe crash outcomes.[27]

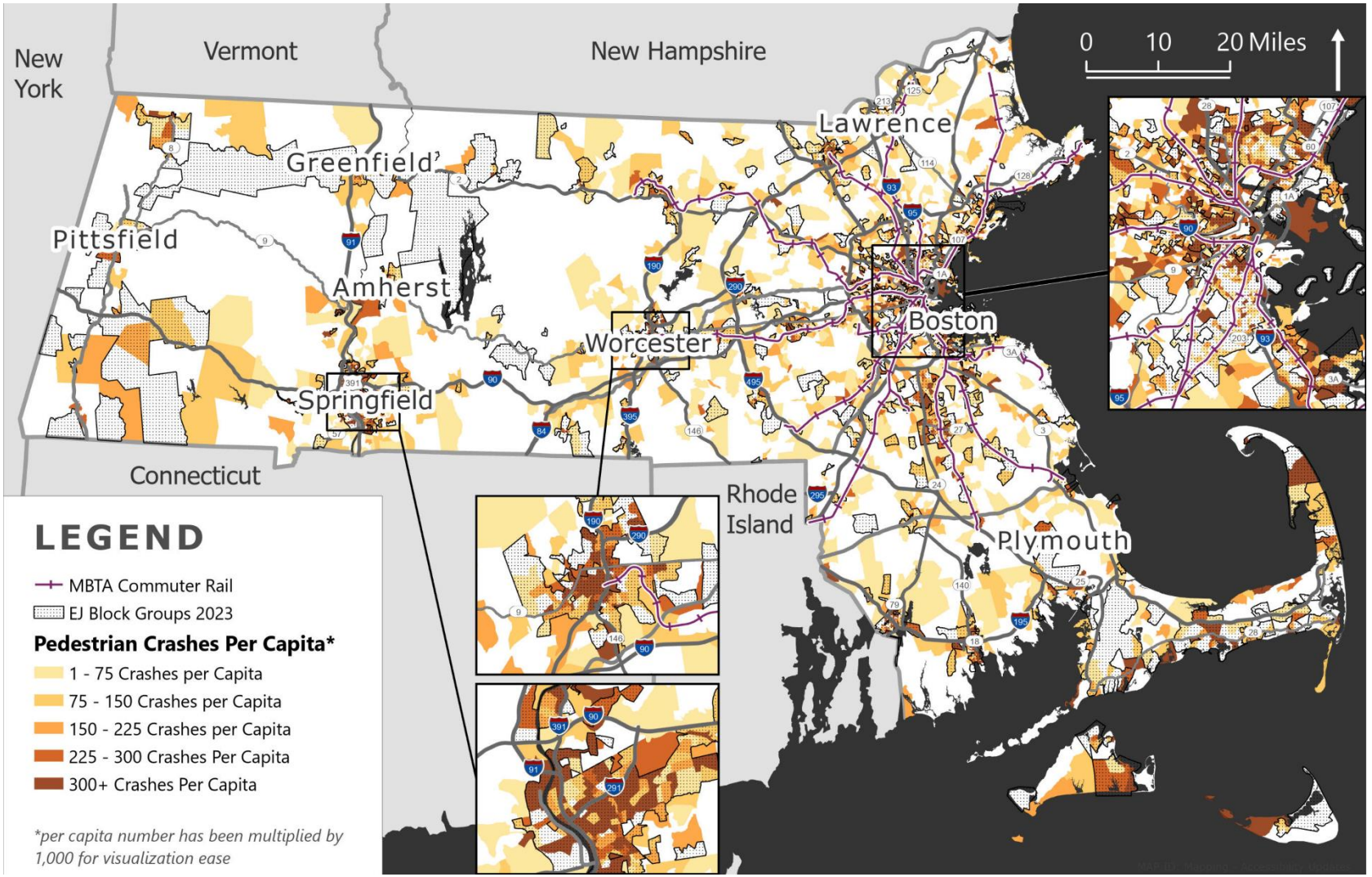
20 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.
21 Beyond Mobility Multilingual and Multicultural Focus Groups and Interviews, 2022.
22 MassDOT Tracker, 2022, https://www.massdottracker.com/wp/; MBTA Transit Safety Performance Targets 2022 Update.
23 Federal Transit Administration (FTA) Safety Management Inspection of the MBTA and Department of Public Utilities, 2022, https://www.transit.dot.gov/sites/fta.dot.gov/files/2022-08/FTA-Safety-Management-Inspection-Report-for-MBTA-and-DPU_0.pdf.
24 MassINC Polling Group, 2023. https://static1.squarespace.com/static/5eb9fa2f8ac4df11937f6a49/t/65551a42e0ee542a089342e8/1700076100123/Topline+2023+11+Barr+Transportation.pdf.
25 Beyond Mobility Gap Analysis—Aeronautics, 2022.
26 Beyond Mobility Gap Analysis—RMV, 2022.
27 Beyond Mobility Vision/Values Workshop, 2022.

Figure 4.2 Fatal and Serious Injury Crashes (2017–2019) and Environmental Justice Communities



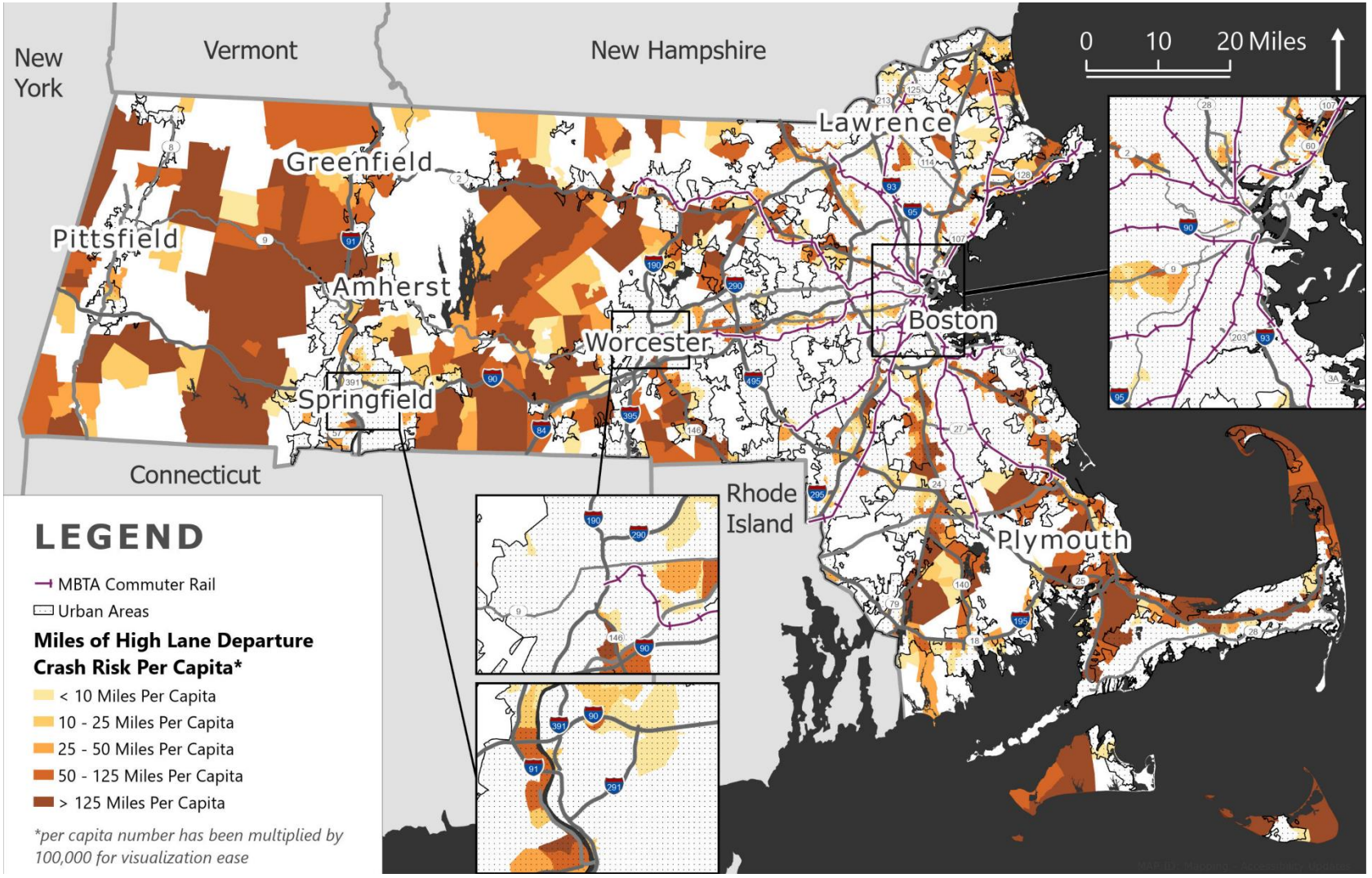
Source: 2016–2020 5-Year ACS, MassDOT Crash Data 2017-2019.

Figure 4.3 Pedestrian Crashes per Capita (2017–2019) and Environmental Justice Communities



Source: 2016–2020 5-Year ACS, MassDOT Crash Data 2017-2019.

Figure 4.4 Roadway Miles at High Risk for Lane Departure per Capita, Urban versus Rural



Source: 2016–2020 5-Year ACS, MassDOT IMPACT Roadway Departure Safety Risk MPO Ranking 2013-2017.

4.3 Reliability

VISION

By 2050, people traveling by any mode or for any trip purpose in Massachusetts will be able to expect consistent travel times at any time of day.

VALUES

- MassDOT is committed to **prioritizing reduced car travel** and reliance on single-occupancy vehicles as the priority strategy for reducing the recurring congestion that contributes to unreliable travel times.
- MassDOT is committed to ensuring that travelers can expect **consistency and dependability in travel times** for all modes and at all times of day.
- MassDOT **does not believe in roadway expansion** as a means to reduce congestion.

PROBLEM STATEMENTS

- Massachusetts travelers by any mode experience congestion and travel delay, resulting in low confidence about the conditions they will encounter and diminished access to everyday needs.
- Roadway congestion diminishes the reliability of public transit bus service, limiting its attractiveness and competitiveness.
- Congestion and freight bottlenecks impact the efficient movement of goods, which drives up labor costs, lowers capital productivity, and often results in higher costs for households and businesses.

DURING **PEAK TRAVEL TIMES**, TRIPS ON ROADWAYS ACROSS THE COMMONWEALTH CAN TAKE BETWEEN **2.5 AND 8 TIMES LONGER THAN OFF-PEAK, FREE-FLOWING TRAFFIC CONDITIONS**[32]

WITHIN THE MBTA SERVICE AREA IN 2022: **BUS RELIABILITY WAS 70%, COMMUTER RAIL RELIABILITY WAS 91%,** AND **SUBWAY RELIABILITY WAS 87%**[36]

Key Facts

PROBLEM STATEMENT 1: Massachusetts travelers by any mode experience congestion and travel delay, resulting in low confidence about the conditions they will encounter and diminished access to everyday needs.
People find transit travel times are unpredictable and take significantly longer compared to other travel options.[28] Around 28 percent of survey respondents cited delays, unpredictable schedules, and/or lack of reliability in mass transit as a challenge they currently face when trying to get around the Commonwealth.[29]
The availability of active transportation infrastructure varies by season due to inconsistent snow removal practices.[30]
For much of Greater Boston, there is high variability in travel times, especially during commuter peak periods. During peak times, trips on many key roadways can take more than three times as long as under free-flowing traffic conditions. Additionally, weekday travel times on key Greater Boston corridors have generally returned to, or in some cases, surpassed pre-pandemic conditions.[31]
People traveling via roadways across the Commonwealth must consistently plan for at least 2.5 times longer than off-peak travel times. They must be prepared for the possibility of their commute taking up to 8 times longer than free-flowing traffic conditions during the most vital daily travel times. This finding is supported by calculations showing that the average planning time index (PTI) is above 2.5 for all of the top 20 most congested corridors in the state between 5 AM and 7 AM, with some corridors averaging over 8 PTI during AM peak periods and 7 during PM peak periods.[32]
Several major commuter corridors in the Boston MPO region have average PTIs above 3.5, making it the most consistently and intensely congested region in Massachusetts. Other MPO regions, such as Cape Cod and Central Massachusetts, also contain corridors whose average PTI exceeds 2, illustrating that congestion and travel time variability extend far beyond the Boston region.[33]
Only six percent of major commuter corridors in the state have a planning time index below or equal to one, meaning commuters across all regions are forced to plan travel time in excess of free flow conditions at any given point during the day.[34]
Schedules between different transit agencies and/or different transit modes do not always align, and on time performance among the RTAs is unknown because of limited data availability and reporting.[35]
PROBLEM STATEMENT 2: Roadway congestion diminishes the reliability of public transit bus service, limiting its attractiveness and competitiveness.

28 The Governors Commission on the Future of Transportation, A Vision for the Future of Massachusetts' RTAs, 2019, https://www.mass.gov/doc/a-vision-for-the-future-of-massachusetts-regional-transit-authorities/download.
29 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.
30 Beyond Mobility Vision/Values Workshop, 2023.
31 MassDOT Monthly Traffic Reports, 2022.
32 Beyond Mobility Needs Assessment Reliability Analysis, 2023.
33 *Ibid.*
34 *Ibid.*
35 Beyond Mobility Vision/Values Workshop, 2023.

In the MBTA service area, bus reliability is 70.68 percent, Commuter Rail reliability is 91.70 percent (according to schedule adherence), and subway reliability is 87.31 percent (according to passenger wait time) in 2022 across peak and off-peak travel times.[36]
Unreliable travel times affect the perceived quality of buses and paratransit services and disincentivize their use.[37]
A lack of enforcement of bus-only lanes leads to increased congestion and less reliability for bus riders.[38]

PROBLEM STATEMENT 3: Congestion and freight bottlenecks impact the efficient movement of goods, which drives up labor costs, lowers capital productivity, and often results in higher costs for households and businesses.
Congestion and bottlenecks impact the efficient movement of goods. A MassDOT analysis of highway bottlenecks in 2022 identified 17 bottleneck locations, including one, I-93 at Route 3 (the Braintree Split), being identified by the American Transportation Research Institute (ATRI) as 99th of the top 100 truck bottlenecks in the US (I-93 and MA-3).[39]
Truck parking shortages have safety and reliability implications. The MassDOT *Freight Plan* indicates that truck parking on service plazas along I-90 is particularly overcrowded.[40]
Unprecedented growth in Boston's Seaport District has led to increased traffic congestion and conflicts between commercial and passenger traffic that continue to threaten truck access to Conley Terminal.[41]

36 Massachusetts Bay Transportation Authority (MBTA) Performance Dashboard, 2023 https://mbtabackontrack.com/performance/#/home.
37 Beyond Mobility Vision/Values Workshop, 2023.
38 *Ibid.*
39 MassDOT Freight Plan, 2023, https://www.mass.gov/doc/2023-massachusetts-freight-plan/download; American Transportation Research Institute Top 100 Truck Bottlenecks, 2023, https://truckingresearch.org/2023/02/07/top-100-truck-bottlenecks-2023/.
40 MassDOT Freight Plan, 2023, https://www.mass.gov/doc/2023-massachusetts-freight-plan/download.
41 MassDOT Freight Plan, 2023, https://www.mass.gov/doc/2023-massachusetts-freight-plan/download.

4.4 Supporting Clean Transportation

VISION

By 2050, MassDOT will have made significant progress in electrifying public transit and investing in other low or no-emission technology, strategically leveraged assets to address critical electric vehicle charging infrastructure gaps, and made investments in infrastructure and initiatives to promote significantly more trips using carbon-free modes such as walking and bicycling.

VALUES

- MassDOT will be intentional about **investing in carbon-free transportation infrastructure** that benefits Environmental Justice communities. MassDOT will incorporate climate science and data into key decision-making processes to ensure the best and most up-to-date science.
- MassDOT is committed to ensuring that **fast charging infrastructure** along major highways promotes ease of access to charging for drivers of electric vehicles.
- MassDOT is committed to **supporting the transition to low- and zero-emission public transit** fleets and the maintenance facilities required to support this transition.
- MassDOT believes that fully achieving decarbonization goals must involve a multi-pronged and systems thinking approach that goes beyond electrification to emphasize the importance of **moving more people with fewer vehicles and cross-disciplinary problem solving**.
- MassDOT will collaborate on decarbonization efforts **across the government** and ensure decarbonization efforts are consistent with other state agencies' efforts.

PROBLEM STATEMENTS

- Transportation is the largest contributor of Massachusetts' carbon emissions and transportation-related emissions are disproportionately concentrated in Environmental Justice communities.
- Availability of suitable infrastructure is a potential barrier to low-emission transportation choices.

THE **TRANSPORTATION SECTOR** WAS RESPONSIBLE FOR **42% OF GREENHOUSE GAS EMISSIONS** STATEWIDE IN 2019[42]

AN ADDITIONAL **900,000 RESIDENTS WILL NEED TO DRIVE ELECTRIC VEHICLES BY 2030** TO MEET THE COMMONWEALTH'S **CLIMATE GOALS**[45]

Key Facts

PROBLEM STATEMENT 1: Transportation is the largest contributor of Massachusetts' carbon emissions and transportation-related emissions are disproportionately concentrated in Environmental Justice communities.
Transportation was responsible for 42 percent of greenhouse gas (GHG) emissions statewide in 2019.[42] In addition to contributing to climate change, GHG emissions from transportation are a leading source of toxic air pollution, including particulate matter (PM) and nitrous oxide, both of which harm human health and are disproportionately concentrated in communities of color in Massachusetts.[43]
Delivery trucks, most of which are diesel-powered, are a growing source of congestion and emissions on Massachusetts roads. The freight network is becoming more decentralized, leading to more trucks traveling through residential areas. This has negative implications for public health.[44]

PROBLEM STATEMENT 2: Availability of suitable infrastructure is a potential barrier to low-emission transportation choices.
By 2030, Massachusetts will need to have 900,000 new electric vehicles (EVs) to meet climate goals.[45] While vehicle cost and range are the largest barriers to those interested in buying an electric vehicle, seven percent of survey respondents cite the availability of charging on, or adjacent to, highways as the most important barrier to buying an electric vehicle.[46]
Majorities of urban (78 percent) and suburban (59 percent) residents would like to bike to work, but 60 percent of people are only comfortable bicycling on shared-use paths, in separated bike lanes, or on quiet streets.[47] However, according to a recent MassDOT analysis, just 6.8 percent of all roadways in the state are considered to have high potential for bicycling.[48]

42 Massachusetts Office of Energy and Environmental Affairs Massachusetts Clean Energy and Climate Plan for 2025 and 2030, 2022, https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2025-and-2030/download.

43 Harvard University T.H. Chan School of Public Health, Transportation, Equity, Climate and Health (TRECH) Project, 2022, https://www.hsph.harvard.edu/c-change/subtopics/trechproject/.

44 Massachusetts Office of Energy and Environmental Affairs, Massachusetts Clean Energy and Climate Plan for 2025 and 2030, 2022, https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2025-and-2030/download.

45 *Ibid.*

46 NEVI Deployment Plan for Massachusetts: Public Sample Survey Results. MassDOT, 2022, https://www.mass.gov/doc/massdot-nevi-plan-accessible-version/download.

47 MassDOT Statewide Bicycle Plan, 2019 https://massdot.maps.arcgis.com/apps/MapJournal/index.html?appid=c80930586c474a3486d391a850007694.

48 MassDOT Potential for Everyday Biking Update, 2022, https://geo-massdot.opendata.arcgis.com/maps/4f36acded5c14bd69d519d47f949e451.

PROBLEM STATEMENT 2: Availability of suitable infrastructure is a potential barrier to low-emission transportation choices.

There are large capital costs of implementing zero-emission buses across RTAs and the MBTA, including the cost of new and upgraded maintenance facilities and charging equipment.[49] The effects of rapid inflation and supply chain issues, in particular for electrical infrastructure and equipment, are ballooning the capital costs and extending timelines for these projects. For example, the bids for the new MBTA Bus Maintenance Facility in Quincy came in at nearly $80 million over the engineer's estimate of $280 million in the Spring of 2022, during the height of inflation and economic uncertainty.[50]

49 Beyond Mobility Vision/Values Workshop, 2023.
50 MBTA Office of the Chief Engineer.

4.5 Destination Connectivity

VISION

By 2050, due to targeted investments that have expanded access to everyday destinations for transit-critical and historically underserved communities statewide, there will be significantly more modal options, more equitable travel times, increased transportation choices, and far fewer first- and last-mile gaps for these communities.

VALUES

- MassDOT believes that the primary purpose of the transportation system is to **connect people to the places that they need and want to go**.
- MassDOT believes in the importance of measuring how **people, rather than just vehicles**, pass through the transportation system.
- MassDOT is committed to the principle that a "**regional rail**" system with expanded service throughout the day is critical to building a stronger and more inclusive state economy.
- MassDOT is committed to supporting **robust on-demand transit services** using dedicated drivers and vehicles across the Commonwealth, especially in communities served by Regional Transit Authorities (RTAs) that may not have and/or lack the density to support fixed route service.

PROBLEM STATEMENTS

- People living in Environmental Justice communities are burdened by connectivity inequities across our transportation system, limiting their access to opportunities.
- The lack of contiguous, safe, high-comfort bike or pedestrian pathways connecting existing pedestrian and bicycle facilities limits the ability of people walking, bicycling, and using other non-motorized modes, including mobility-assistive devices, to access critical destinations.
- Residents outside of inner core areas across the Commonwealth, particularly those in rural areas, lack convenient transit services and other non-vehicular transportation options and feel disconnected from cultural, economic, and other opportunities. Additionally, current passenger rail service opportunities for the western half of the Commonwealth are extremely limited. Though the Commonwealth supports reduced car travel as a climate change strategy, people traveling in Massachusetts find it difficult to get around using other modes including transit, cycling, and water transportation.
- Existing land use patterns reinforce car travel and exclude lower-income people from having sufficient modal choices.

ONLY **1.2%**
OF ALL TRIPS UNDER 3 MILES IN MASSACHUSETTS ARE **MADE BY BICYCLISTS**[64]

69%
OF ALL BEYOND MOBILITY TRADEOFF SURVEY RESPONDENTS DESIRE **CAR-FREE CONNECTIVITY FROM THEIR FRONT DOOR TO THEIR DESTINATIONS**[63]

60%
OF MASSACHUSETTS RESIDENTS **DROVE ALONE TO WORK** IN 2021[65]

Key Facts

PROBLEM STATEMENT 1: People living in Environmental Justice communities are burdened by connectivity inequities across our transportation system, limiting their access to opportunities.
In Greater Boston, Black commuters experience longer travel times via every reported mode when compared to white commuters, and the disparity has grown larger in recent years.[51]
About 64 percent of non-white and low-income respondents and 58 percent of all *Beyond Mobility* survey respondents want to see improvements in network connectivity and coverage.[52] When asked to prioritize a series of transportation investments, low-income respondents ranked "bus-only lanes connecting to transit stations and activity centers" highest.[53]
Over half of all Meeting-in-a-Box participants referenced the importance of microtransit and/or first and last-mile connections to fixed route transit.[54]
Despite having more areas with high potential for bicycling, Environmental Justice communities have fewer existing and planned bike facilities per capita than all other communities (Figure 4.5 and Figure 4.6).[55]

PROBLEM STATEMENT 2: The lack of contiguous, safe, high-comfort bike or pedestrian pathways connecting existing bicycle facilities limits the ability of people walking, bicycling, and using other non-motorized modes, including mobility-assistive devices, to access critical destinations.
Approximately 97.5 percent of MassDOT-owned roads and 97.4 percent of locally owned roads where bicycling is allowed lack designated bicycle facilities.[56]
The condition of bicycle and pedestrian facilities varies greatly based on season and geographic location, as snow clearance and other maintenance operations are often under local jurisdiction and vary by municipality.[57]
PROBLEM STATEMENT 3: Residents outside of inner core areas across the Commonwealth, particularly those in rural areas, lack convenient transit services and other non-vehicular

51 Metropolitan Area Planning Council, Metro Common x 2050 Indicators, 2021, https://metrocommon.mapc.org/assets/MC2050_COMPLETE_PDF-e2ed6a9e41af35a4bfb88863ecfb07addcedbcd81bc874c69dee21f870b020b0.pdf.
52 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.
53 Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.
54 Beyond Mobility Meeting-In-A-Box Focus Group Sessions, 2023.
55 MassDOT GeoDOT, Bike Inventory, 2020.
56 MassDOT Statewide Bicycle Plan, 2019 https://massdot.maps.arcgis.com/apps/MapJournal/index.html?appid=c80930586c474a3486d391a850007694.
57 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

transportation options and feel disconnected from cultural, economic, and other opportunities. Additionally, current passenger rail service opportunities for the western half of the Commonwealth are extremely limited.
Around 66 percent of respondents from rural communities identified transit system expansion and/or better connectivity and frequency as aspects of a flawless transportation system for Massachusetts.[58] When asked to pick between three categories of needed infrastructure improvements, 57 percent of respondents from rural communities selected "transit elements" as their first choice.[59]
Of the 36 rural respondents to the Tradeoff Survey, 53 percent reported being unsatisfied or very unsatisfied with job access; 57 percent were unsatisfied or very unsatisfied with access to food retailers; and 60 percent were unsatisfied or very unsatisfied with access to healthcare.[60]
When asked to prioritize a series of investments, respondents from rural communities ranked "improved bicycle and pedestrian connections to transit stations" highest.[61]
Although pilots of microtransit and fixed route service expansions in rural and suburban areas provide important connections to critical destinations, there is a lack of ongoing and sustained funding and challenges associated with measuring the success of these services compared to those in urban areas, limiting their fiscal sustainability.[62]

PROBLEM STATEMENT 4: Though the Commonwealth supports reduced car travel as a climate change strategy, people traveling in Massachusetts find it difficult to get around using other modes including transit, cycling, and water transportation.
Around 69 percent (1,743) of all Tradeoff Survey respondents, 70 percent of low-income respondents, and over 70 percent of respondents with a disability or who are over 65 years of age selected "car-free connectivity from point of departure to destination" as a feature of a great transportation system.[63]
Only 1.2 percent of trips between zero to three miles are made by bicycles statewide, and just 2.5 percent of MassDOT roads and 2.6 percent of local roads have bike facilities.[64]
Approximately 59.5 percent of Massachusetts residents drove alone to work in 2021, with higher rates in central and western Massachusetts. Commute times by automobile are longer in the eastern part of Massachusetts than in the rest of the state, while commute times for people using public transportation are consistent across the state and significantly higher than commuting by car.[65]

58 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.
59 Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.
60 *Ibid.*
61 *Ibid.*
62 Beyond Mobility Gap Analysis—Rail and Transit, 2022.
63 Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.
64 MassDOT Bicycle and Pedestrian Update—2021 https://storymaps.arcgis.com/stories/446e35bc40614e5aaced4a62ff7343b2.
65 American Community Survey, 2021, 5-year tables, B08134 Means of Transportation to Work by Travel Time to Work and B08301 Means of Transportation to Work.

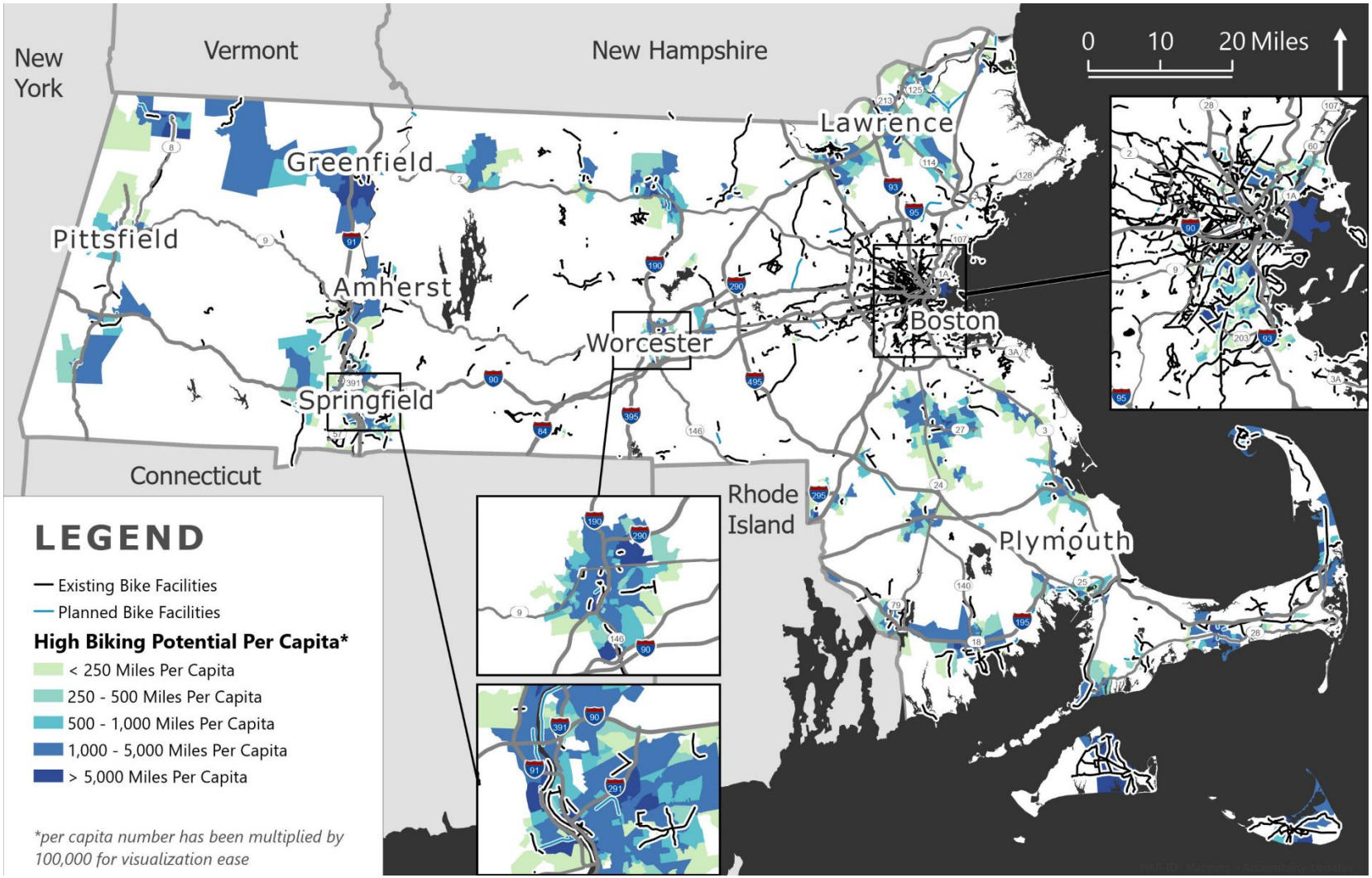
PROBLEM STATEMENT 5: Existing land use patterns reinforce car travel and exclude lower-income people from having sufficient modal choices.
Development patterns and zoning regulations in Massachusetts cities and towns largely favor single-family homes and single-use neighborhoods where destinations are far apart from each other, which reinforces automobile travel as the most convenient and effective way to get around.[66]
As an example, the stretch of Route 128/I-95 between Newton and Lexington is one of the most congested roadway corridors in the state. Its land use is dominated by office space, and to a lesser extent, industrial and retail spaces, which cumulatively attract 97 times as many workers as there are residents. Nearly 56,000 people work in the study area, but just 500 of these workers live locally due to the lack of available housing. About 60 percent of people who work in this study area live at least ten miles away; what this means is that a lot of people are traveling on the same roads at about the same times to this major employment hub, creating recurring congestion that is past the network's tipping point.[67]
Of the 261 light rail, heavy rail, and bus stops in the Greater Boston Area, 61 percent have fewer than 10 homes per acre and 41 percent have fewer than five homes per acre, stifling potential transit-oriented development opportunities.[68]

66 Massachusetts Office of Energy and Environmental Affairs, Massachusetts Clean Energy and Climate Plan for 2025 and 2030, 2022, https://www.mass.gov/doc/clean-energy-and-climate-plan-for-2025-and-2030/download.

67 MassDOT Route 128 Land Use and Transportation Study Final Report, 2023, https://www.mass.gov/route-128i-95-study.

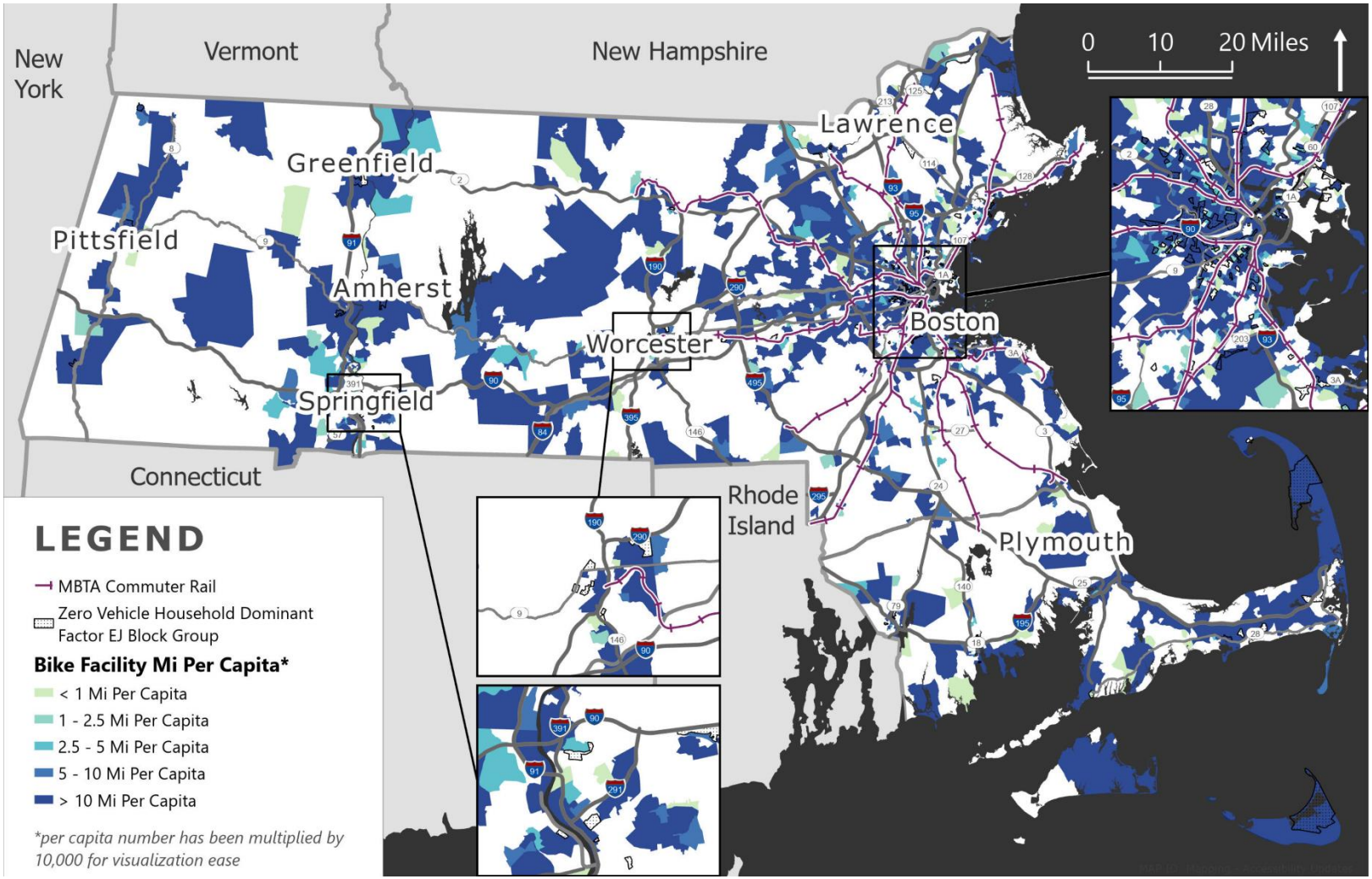
68 Massachusetts Housing Partnership, TODEX Transit Oriented Development Explorer Research Brief, 2019, https://www.mhp.net/news/2019/todex-research-brief.

Figure 4.5 High Potential for Everyday Biking per Capita and Existing and Planned Bicycle Facilities



Sources: 2016–2020 5-Year ACS, MassDOT Potential for Everyday Biking 2022, MassDOT Bike Inventory 2020.

Figure 4.6 **Existing and Planned Bicycle Facilities per Capita and Zero-Vehicle Household Most Dominant Factor (MDF) Environmental Justice Communities**



Source: 2016–2020 5-Year ACS, MassDOT Bike Inventory 2020.

4.6 Resiliency

VISION

By 2050, significant investments to mitigate climate threats and impacts (such as urban heat islands, flooding, sea level rise, and stormwater runoff) have protected transportation assets against natural hazards and climate change impacts.

VALUES

- MassDOT will be proactive about understanding the elements of the network at the highest risk from climate change and implementing strategies to reduce these risks.
- MassDOT will pursue resiliency efforts across the entire agency, including each modal division and all shared services.
- MassDOT investment decisions about new transportation infrastructure will take into account floodplains and sea level rise projections.
- MassDOT will prioritize resiliency improvements by targeting the largest risks from climate change impacts, including sea level rise and flooding.
- Acknowledging that a whole-of-government approach is needed to tackle the climate crisis, MassDOT will collaborate on resiliency efforts **across the government** and ensure resiliency efforts are consistent with other state agencies' efforts.

PROBLEM STATEMENTS

- Significant transportation infrastructure in Massachusetts is exposed to natural hazards.

OVER 75%
OF THE POPULATION **LIVES IN COASTAL AREAS** OF MASSACHUSETTS, WHICH COULD EXPERIENCE AN ESTIMATED **SEA LEVEL RISE OF 2.3 TO 4.2 FEET BY 2070** (OVER 2000 LEVELS)[70]

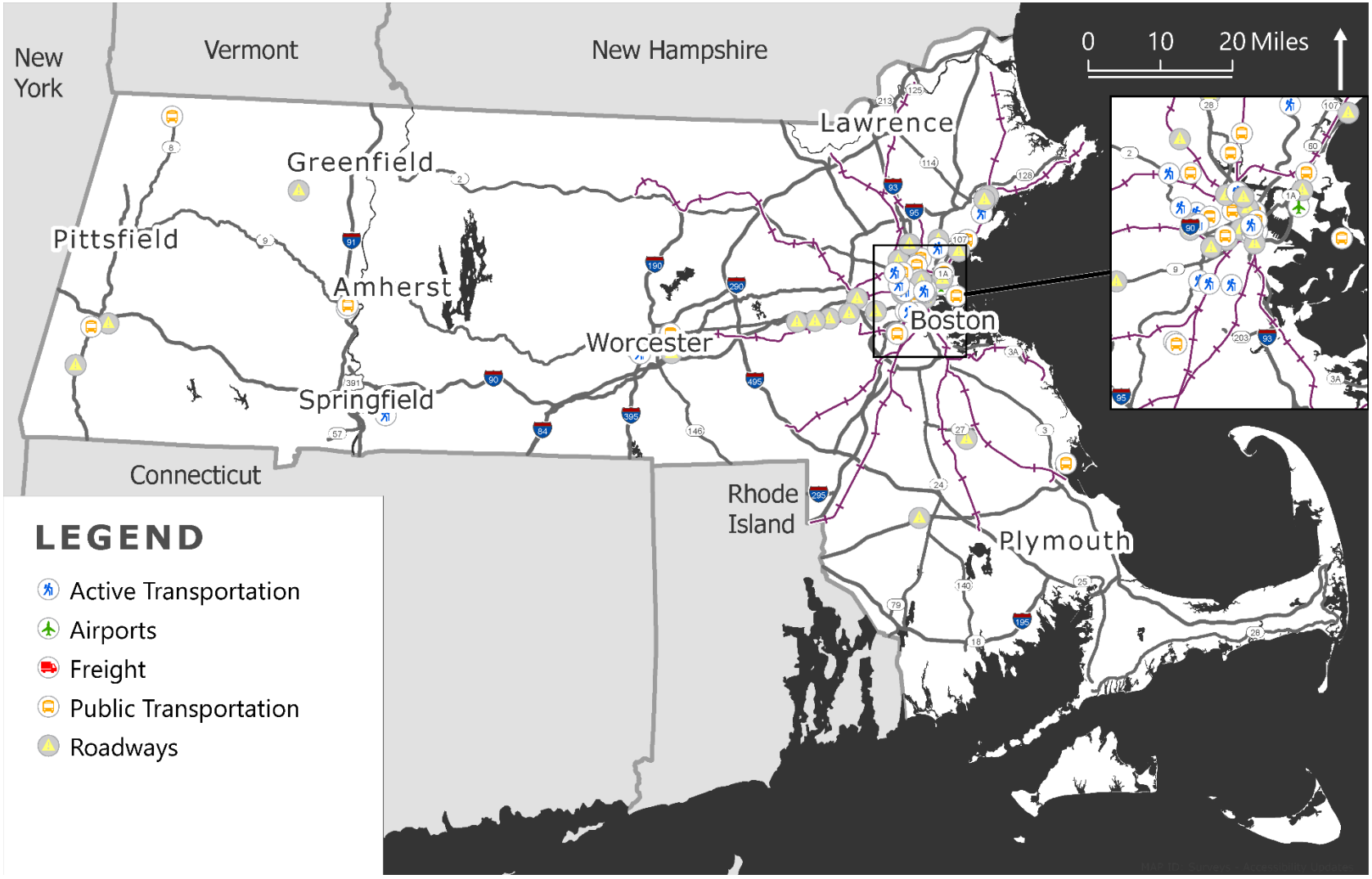
NINE OUT OF THE TOP 20 WARMEST YEARS
ON RECORD IN MASSACHUSETTS **HAVE OCCURRED SINCE 2010**: 2010, 2011, 2012, 2013, 2016, 2017, 2018, 2020, AND 2021[76]

Key Facts

PROBLEM STATEMENT 1: Significant transportation infrastructure in Massachusetts is exposed to natural hazards.
Figure 4.7 illustrates key locations that survey respondents identified as having resiliency concerns across active transportation, airports, freight movement, public transportation, and roadways.[69] Please note that Figure 4.7 only represents responses related to resiliency concerns on the Beyond Mobility survey. For a fuller description of resiliency needs, please visit the ResilientMass Municipal Vulnerability Preparedness Program webpage: https://resilient.mass.gov/mvp/.
By 2070, some projections estimate a rise in sea level of 2.3 to 4.2 feet over 2000 levels.[70]
MassGIS estimates that given two feet of sea level rise, more than 96 miles of roadway in the state and two bus stops would be flooded; that five feet of sea level rise would lead to 850 roadway miles and 364 bus stops flooded; and that ten feet of sea level rise would mean 2,100 roadway miles and 1,249 bus stops, 81 rapid transit stops, and 15 Commuter Rail stops flooded.[71]
Research into the impacts of storms on the MBTA's system found that as soon as 2030, a 100-year storm would completely inundate the Blue Line and large portions of the Red and Orange Lines. By 2070, a 100-year storm would flood nearly the entire network, sparing only some sections of the Green and Orange lines, with "system connectivity" reduced to just nine percent.[72]
Over 3,300 miles of roadway, the vast majority of which are locally owned, are located within Hurricane Category 4 impact areas.[73] Additionally, more than 2,200 MBTA bus stops, 100 MBTA rapid transit stations, and 20 MBTA Commuter Rail stations are also located within Hurricane Category 4 impact areas.
Across Massachusetts, 2,567 bridges and 3,322 roadway miles are within 100 feet of flowing waterbodies and therefore have a higher probability of being exposed to riverine flooding, including any increases in flooding resulting from climate change.[74]
Many bridges and culverts are or will be subjected to coastal and riverine flooding, particularly those that are hydraulically undersized or tidally restricted. Analyses have shown that vulnerability may increase to 108 culverts, 53 bridges, and over 400 miles of stream channel by 2070 due to climate change.[75]
Nine out of the top 20 warmest years on record in Massachusetts have occurred since 2010: 2010, 2011, 2012, 2013, 2016, 2017, 2018, 2020, and 2021. By 2050, there may be up to 40 fewer days per year with daily minimum temperatures below freezing.[76]
Impacts of extreme heat on Massachusetts' transportation system include but are not limited to an increased number of slow zones on light and heavy rail transportation due to a reduction in track capacity; softening pavement condition on roadways and airport runways; and power outages impacting electrified public transit and electric vehicle power demand during hotter summer days.[77]

69 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.
70 Massachusetts Department of Public Health, Sea Level Rise: Climate Hazard Adaptation Profile, 2023, https://www.mass.gov/info-details/sea-level-rise.
71 MassGIS, NOAA Sea Level Rise, 2019.
72 Martello et. al. "Evaluation of climate change resilience for Boston's rail rapid transit network," 2021, https://www.sciencedirect.com/science/article/abs/pii/S1361920921002078.
73 MassGIS, Hurricane Surge Inundation Zones, 2013.
74 MassDOT Flood Risk Assessment, 2023, https://www.mass.gov/massdot-flood-risk-assessment.
75 Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan, 2018, https://www.mass.gov/files/documents/2018/09/17/SHMCAP-September2018-Chapter4.pdf.
76 NOAA National Centers for Environmental Information, "Climate at a Glance: Statewide Time Series." 2022, https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/time-series; Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan, 2018, https://www.mass.gov/files/documents/2018/09/17/SHMCAP-September2018-Chapter4.pdf.
77 Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan, 2018, https://www.mass.gov/files/documents/2018/09/17/SHMCAP-September2018-Chapter4.pdf.

Figure 4.7 Survey Responses—Resiliency Concerns



Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

4.7 Travel Experience

VISION

By 2050, equitable access to a high-quality and well-maintained transportation network will be expanded throughout the Commonwealth, with special attention to Environmental Justice and rural communities. The system's state of good repair will be routinely positive and maintenance backlogs will be minimal. Enhanced wayfinding and information will support systemwide navigation for users of all ages, abilities, and languages. Transit facilities will be safe, clean, and comfortable with modern seating, lighting, and features that improve users' experience.

VALUES

- MassDOT believes that achieving a state of good repair for all transportation assets is important not only for a more pleasant and comfortable travel experience but also for **maintaining overall system quality**.
- MassDOT believes that **all travelers in the state deserve** a transportation system that is easy to understand, ADA accessible, inclusive of signage and wayfinding on transit and roadways, and contains dynamic traveler information services and resources.
- MassDOT believes that targeted transit expansions and increased transit frequency in underserved areas are critical to encouraging mode shift.
- Consistent with statewide environmental goals, MassDOT's improvements in travel experience will be used to **encourage modal shift** from single occupancy vehicles to public and active transportation modes.

PROBLEM STATEMENTS

- All transit riders, including users of paratransit and human services transportation (HST), deserve a better user experience and increased affordability on transit, in Environmental Justice communities and across the Commonwealth.
- Missing sidewalks, curb ramps, and crosswalks limit mobility options, especially for older adults, people with disabilities, and children. This is a particular issue in rural communities, where many such residents live.
- Transit riders, people with disabilities, and limited English proficient (LEP) community members find it challenging to understand and navigate transit infrastructure, including stations, service changes involving diversions, and alternative routing options.
- Bicyclists report that wayfinding and amenities at facilities are confusing or substandard.
- The systems and protocols that support excellent customer service are not always prioritized.

29%
OF ALL **MBTA RIDERS** AND
42%
OF **MBTA BUS RIDERS** HAVE **AN INCOME OF LESS THAN**
$43,500[78]

22%
OF TOTAL **ROADWAY MILES** WITHIN ONE-HALF MILE OF A TRANSIT STOP
HAVE SIDEWALK GAPS[80]

AS A PERCENTAGE OF TOTAL ROADWAY MILES,
RURAL COMMUNITIES HAVE
1.65 TIMES MORE SIDEWALK GAPS
THAN URBAN COMMUNITIES[84]

Key Facts

PROBLEM STATEMENT 1: All transit riders, including users of paratransit and human services transportation (HST), deserve a better user experience and increased affordability on transit, in Environmental Justice communities and across the Commonwealth.
Across the whole MBTA system, 29 percent of all riders have an income of less than 60 percent of the area median income of $72,500, whereas among MBTA bus riders, 42 percent have incomes below this level. Riders on Massachusetts' 15 RTA bus routes tend to have even lower incomes, are more likely to be non-white, and are more dependent on public transit for travel.[78]
Approximately 33 percent of all survey respondents, 35 percent of low-income respondents, and 36 percent of respondents of color identified user experience as an attribute of a great transportation system.[79]

PROBLEM STATEMENT 2: Missing sidewalks, curb ramps, and crosswalks limit mobility options, especially for older adults, and people with disabilities, and children. This is a particular issue in rural communities, where many such residents live.
Around 22 percent of roadway miles near transit stops (i.e., within one-half mile) anywhere in the state have sidewalk gaps, and 20 percent of curb ramps within one-half mile of transit stops are deficient.[80]
Approximately 72 percent of locally-owned roads and 57 percent of MassDOT-owned roads where walking is allowed currently lack sidewalks (Figure 4.8).[81] Additionally, people with disabilities find it difficult to use transit due to poor infrastructure, including sidewalk gaps.[82]
Environmental Justice communities experience a higher proportion of deficient curb ramps within one-half mile of transit stops—26 percent of all curb ramps within one-half mile of a transit stop, compared to only seven percent in non-EJ communities.[83]

78 MassBudget, Free Buses Advance Equity, 2021, https://massbudget.org/2021/03/24/free-buses-advance-equity/.
79 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.
80 MassDOT Road Inventory, GeoDOT, 2020.
81 MassDOT Statewide Pedestrian Transportation Plan, 2019 https://massdot.maps.arcgis.com/apps/MapJournal/index.html?appid=96339eb442f94ac7a5a7396a337e60c.
82 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.
83 GeoDOT, Pedestrian Curb Cuts, 2018.

PROBLEM STATEMENT 2: Missing sidewalks, curb ramps, and crosswalks limit mobility options, especially for older adults, and people with disabilities, and children. This is a particular issue in rural communities, where many such residents live.
Rural communities have 1.65 times more sidewalk gaps as a percentage of total roadway miles, 3.5 times more poor/fair road conditions per capita, 4.4 times more poor/deficient bridges per capita, and 1.3 times more deficient curb ramps than urban communities.[84]

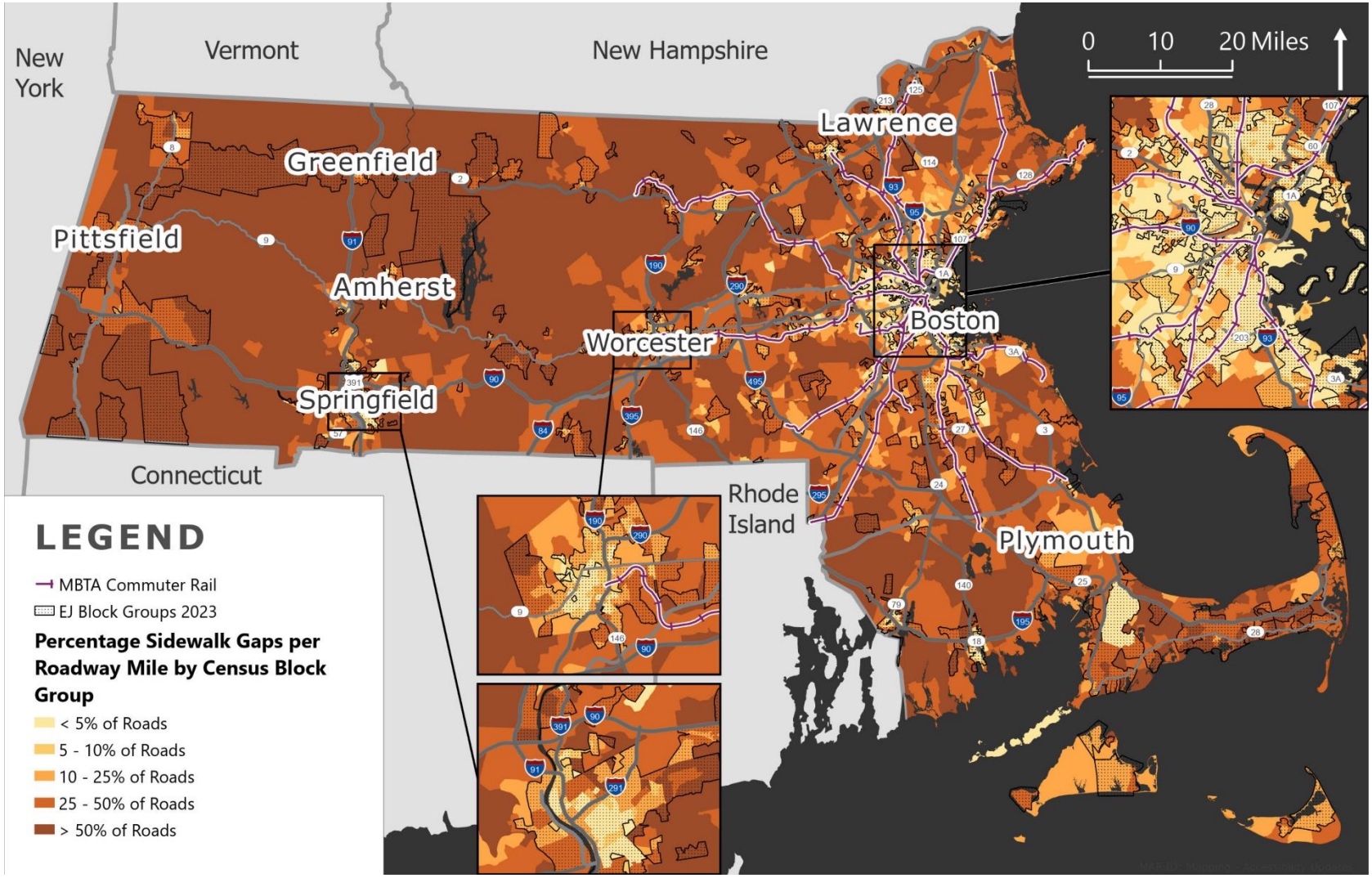
PROBLEM STATEMENT 3: Transit riders, people with disabilities, and limited English proficient (LEP) community members find it challenging to understand and navigate transit infrastructure, including stations, service changes involving diversions, and alternative routing options.
People find the transit system challenging to use due to unclear wayfinding, challenges learning about community transportation options available, poor ADA accessibility, and lack of transit employees present.[85]
Transit system riders are reliant on third-party applications for travel time information, which vary in reliability and accuracy.[86]
People with limited English proficiency, lower-income people, and people with disabilities report a need for improved wayfinding signage and information to assist travelers far more than other groups.[87]

PROBLEM STATEMENT 4: Bicyclists report that wayfinding and amenities at facilities are confusing or substandard.
Bicycle riders report that the bicycling network in Massachusetts lacks intuitive wayfinding, signals, lane markings, and amenities such as water fountains and parking.[88]
Protected and traffic-separated multimodal facilities remain inconsistent even in urban core areas, with protected lanes often merging into shared vehicle traffic and sidewalks varying in width, condition, and grade, which influences people's willingness to bike. Ninety-four percent of participants in the 2019 *Massachusetts Bicycle Transportation Plan* outreach indicated that they would bike if they were separated from vehicles, while only 33 percent of them were willing to bike in mixed traffic.[89]

PROBLEM STATEMENT 5: The systems and protocols that support excellent customer service are not always prioritized.
There is a need to improve customer service at the RMV through investments in systems such as online renewals, improved data security, and fraud/identity theft prevention.[90]
Due to high-profile and time-sensitive pressures such as managing project costs, delivering system expansions, and staffing at the MBTA, other initiatives such as customer service are often not able to be prioritized.[91]

84 MassDOT Road Inventory, GeoDOT, 2020; GeoDOT, Pavement Condition, 2020; GeoDOT, Bridges, 2022; GeoDOT, Pedestrian Curb Cuts, 2018.
85 Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.
86 *Ibid.*
87 Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.
88 MassDOT Statewide Bicycle Plan, 2019 https://massdot.maps.arcgis.com/apps/MapJournal/index.html?appid=c80930586c474a3486d391a850007694.
89 MassDOT Statewide Bicycle Plan, 2019 https://massdot.maps.arcgis.com/apps/MapJournal/index.html?appid=c80930586c474a3486d391a850007694.
90 Beyond Mobility Gap Analysis—RMV, 2023.
91 Beyond Mobility Gap Analysis—MBTA, 2023.

Figure 4.8 Sidewalk Gaps and Environmental Justice Communities



Source: 2016-2020 5-Year ACS, MassDOT Road Inventory 2021

5.0 Action Items

5.1 Introduction and Background

This chapter articulates the actions that MassDOT and the MBTA will take in response to the vision, values, and Problem Statements identified in Chapter 4. These Action Items both account for ongoing initiatives and programs that MassDOT and the MBTA are already involved in and propose new complementary strategies. In short, these Action Items codify the findings of previous Plan sections into actionable next steps. Developing these Action Items was a crucial component of Beyond Mobility because they define how MassDOT will address identified problems and establish the lead parties responsible for Action Item implementation. The Action Items identified below are organized by *Beyond Mobility's* six key Priority Areas.

Chapter 7, "Funding the Transportation System," outlines various funding sources that support transportation investments in Massachusetts. Each year, when developing its rolling five-year *Capital Investment Plan*, MassDOT works with its transportation planning partners to determine the level of funds available from each source to fund capital projects. For example, MassDOT works with USDOT and its modal administrations to understand the funding available through various Federal formula funding programs; MassDOT also coordinates with the Commonwealth's Executive Office for Administration and Finance on the total amount of general obligation bond debt that will support MassDOT's Capital programs. Similar processes to identify available funding are carried out for the MBTA's *Capital Investment Plan* and MassDOT's and the MBTA's operating budgets. The annual development of these plans will enable MassDOT, the MBTA, and their planning partners to assess opportunities and resources available to advance Beyond Mobility's priorities and action steps.

Also, with respect to funding, at the time of the development of *Beyond Mobility*, the Healy-Driscoll Administration announced the creation of a new Transportation Funding Task Force. This Task Force will be composed of public and private-sector leaders, representing communities of all sizes across Massachusetts, who will examine the Commonwealth's transportation system and develop a toolkit that builds on the Beyond Mobility plan to document steps needed to implement the next generation of transportation investments in Massachusetts **Action Item Development**

Action Items were identified and confirmed through an iterative process. Actions in previous planning documents provided a solid foundation, and public input confirmed or updated those priorities. Stakeholder interviews—both internal and external to MassDOT—were conducted to further understand problem areas and potential actions. These Action Items were reviewed by subject matter experts and refined by MassDOT staff through internal workshops and individual reviews.

Action Items are grouped into the following categories:

- **Policy and programming efforts:** The formulation of new policies and/or funding programs that address identified problems.
- **Research:** The development of scopes of work and/or problem statements in response to the issues identified, serving as a "Research Roadmap" for MassDOT and its partner agencies.

- **Partnerships:** Coordination with regional, local, and Federal partners to advance new initiatives and ideas.
- **Capital planning efforts:** Changes to MassDOT and MBTA capital plan budget program sizes and/or processes that direct funding within each program.
- **Operational improvements:** Changes to the operation of transportation services that would address identified problems.

All MassDOT Divisions with current or potential programs, policies, or initiatives related to the Action Items are listed, with the presumed 'lead' Division highlighted in **bold text.** In order to meet anticipated long-term needs and have initiatives in place by the year 2050, suggested time frames for each Action Item are also included, with 'short term' activities anticipated to take place within the next five to ten years, and 'mid term' activities anticipated to take place within the next decade or beyond.

As a final "filter," the Action Items were tested against three scenarios to ensure they were relevant across a wide range of potential futures. These scenarios, developed by MassDOT to represent three plausible alternative futures for the state's transportation network in 2050, were the following:

- **Hybrid and Diverse,** in which all recent trends **accelerate**. As work-from-home spreads demand across the Commonwealth, the growth in housing prices and resulting displacement are greater in areas farther from Boston. The biotechnology industry has exploded, and laboratory facilities are often sited in mixed-use "villages" in inland areas. Summers become hotter and the whole year becomes wetter.
- **Ahead as Before,** in which all recent trends **maintain**. Hybrid work models proliferate in industries where this is possible. As Baby Boomers leave the workforce, they are replaced by smaller generations, leading to persistent labor shortages and inflation as higher wages filter down to consumer prices. Massachusetts' knowledge economy maintains its strength in biotechnology but plateaus in other high-tech sectors. Less of the winter is severely cold, though winter precipitation increases in the form of rain or freezing rain.
- **Close and Connected,** in which all recent trends **plateau or reverse**. Workers reenter the traditional office space. Housing costs plateau across the Commonwealth as a divided economy (knowledge inside I-495; industrial outside) spreads demand for housing. Historically marginalized residents are effectively priced outside of Route 128. Automation supports but does not supplant blue-collar employment, while the knowledge economy plateaus and consolidates in Boston, Cambridge, and Somerville.

Although there are known actions that would contribute to addressing the problems identified in the first phase of the Plan, the actions documented in this section are those that can be implemented and/or analyzed by MassDOT's modal Divisions, shared services (e.g., Office of Transportation Planning), and the MBTA. Many of these Action Items are consistent with other MassDOT and Commonwealth strategic plans and initiatives, such as the *2023 Strategic Highway Safety Plan* (SHSP), the *2023 Transportation Asset Management Plan* (TAMP), the *MBTA's Strategic Plan*, the MBTA's 2023 *Capital Needs Assessment and Inventory* (CNAI), the *National Electric Vehicle Infrastructure (NEVI) Plan*, the *2023 Resilient Mass Plan*, the *2023 Massachusetts Climate Chief Report*, and the *Massachusetts Clean Energy and Climate Plan for 2025 and 2030*, among others.

Consistent across all efforts is the theme that in order to meet Massachusetts' climate goals, there is a need to increase the percentage of transit trips made in Massachusetts by attracting new riders and retaining existing riders with dependable, frequent, and accessible service. Many of the *Beyond Mobility* Action Items identified in this chapter support this goal and mode shift more broadly, including but not limited to those focused on expanding transit-priority infrastructure such as dedicated bus lanes, regional rail, multimodal connections to transit, Complete Streets and multimodal infrastructure improvements, and accessibility improvements.

Beyond Mobility will also directly inform future related planning efforts at MassDOT and the MBTA. These future planning efforts include but are not limited to the Program for Mass Transportation (PMT), which represents a 25-year plan for how the MBTA can meet the needs of the region; MassDOT Highway Division's *Resiliency Improvement Plan*; future modal plans; corridor studies; capital plans; and other related strategic planning efforts.

An online Action Items Progress Report has also been developed to assist track progress on all of the Beyond Mobility Action Items.

5.2 Safety

Ongoing Safety Efforts

MassDOT and its partner agencies are continually involved in planning efforts to analyze and improve safety conditions on transit, roadways, and other transportation facilities in Massachusetts. These efforts include MassDOT's 2023 *Strategic Highway Safety Plan* (SHSP), Road Safety Audits (RSAs), Highway Safety Improvement Program (HSIP), 2023 *Vulnerable Road User Safety Assessment*, transit providers' *Public Transportation Agency Safety Plans* (PTASPs), safety investments included in MassDOT's Capital Investment Plan (CIP) and the MBTA's CIP, and the MBTA's *3-Year Safety Improvement Plan*, among others.

The SHSP lays out a vision for zero roadway fatalities and serious injuries and the most impactful actions identified to date that can be taken to move towards zero deaths. These actions include speed management to realize safer speeds; addressing top-risk locations and populations; taking an active role in vehicle design, features, and use; and accelerating research and adoption of technology.

For capital planning and programming, MassDOT's Federally funded Safety Improvements, Safe Routes to School, and Intersection Improvements Programs in the *State Transportation Improvement Program* (STIP) and *Capital Investment Plan* (CIP) fund tens of millions of dollars of safety projects statewide each year. State-funded programs such as Complete Streets and Shared Streets and Spaces also award millions of dollars to communities on an ongoing basis to make safety improvements to infrastructure across the Commonwealth. Since its start in June 2020, the Shared Streets and Spaces Program has awarded a total of $50 million to 228 municipalities and seven transit authorities to implement 494 projects.

The Highway Division's Traffic Safety Section is also continually tracking safety data across the Commonwealth through MassDOT's Impact Portal to identify high-crash and high-risk locations. Additionally, MassDOT has developed a *Vulnerable Road User (VRU) Safety Assessment*, which documents vulnerable road users at the highest risk for crashes using a data-driven approach.

Vulnerable road users include people walking, riding bicycles, and using assistive devices for mobility. MassDOT is taking steps to support Massachusetts' new Vulnerable Road Users Law through activities such as providing new signage to municipalities giving notice that a safe passing distance of four feet is required for vehicles passing vulnerable road users.

In addition to all transit providers developing PTASPs to analyze the safety of their respective systems, many are also making targeted investments in safety projects. The MBTA's *2024–2028 Capital Investment Plan*, for example, contains more than 475 safety projects to improve safety across the system.

The Aeronautics Division conducts airport inspections/accident investigations at public-use airports. Small Uncrewed Aircraft Systems/drones complement physical inspections to help identify obstructions that could pose hazards to flight. The Aeronautics Division also collaborates with other MassDOT Divisions training staff, to leverage Uncrewed Aircraft Systems/drone infrastructure data collection—further improving safety for the traveling public. The Aeronautics Division also runs the Commonwealth UAS/drone Integration Program (CUIP) to identify and foster technologies to support drone and Advanced Air Mobility (AAM) activities, including Counter-UAS security systems (e.g., the National Counter-UAS Center of Excellence) to guard against the negligent or hostile use of drones.

Safety Action Items

Safety Problem Statement 1

Environmental Justice (EJ) Communities—areas with larger populations of low income, limited English proficiency, and/or residents of color—are disproportionately burdened by transportation-related injuries and deaths on roadways, particularly those involving pedestrians and people on bicycles.

Table 5.1 Safety Action Items—Problem Statement 1

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI1.1 Bench of safety projects. MassDOT will coordinate with municipalities on prioritizing current projects and building a bench of future projects to address safety concerns throughout the state and in communities most disproportionately burdened by unsafe conditions. This bench of projects will culminate in a formal *Capital Investment Plan* (CIP) program dedicated to addressing safety issues for vulnerable road users.	Policy and Program Capital Planning	**Highway** OTP	New	Mid term	SAI2.1; 2.2; 2.3; 3.1; 3.3; 3.4 RAI1.5 SCTAI 1.1

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI1.2 Tracking safety action plans + prioritization plan. MassDOT will continue to fast-track technical assistance for locally initiated safety action plans in Environmental Justice communities for municipalities and MPOs to more quickly access both Federal formula funding for safety projects as well as Safe Streets and Roads for All (SS4A) Program implementation grant funding through BIL. In line with these efforts, a prioritization plan will be established to determine where similar future efforts should be targeted.	Partnerships	**Highway**	Ongoing	Mid term	TEAI2.2
SAI1.3 Incorporating crash rate disparities in Tracker. MassDOT will incorporate performance measures on reducing disparities in crash rates between different community types into MassDOT's Performance Management Report, Tracker.	Research	**OPMI** OTP Highway	Ongoing	Short term	SAI1.4; 2.1; 3.2 DCAI1.2
SAI1.4 Tracking crashes through an equity lens. Consistent with the SHSP, MassDOT will continue to track crash data through an equity lens to quantify disparities in crash rates between Environmental Justice and others (while accounting for communities with higher-than-average concentrations of people with disabilities) and identify which locations in these communities have particularly high crash rates.	Research	**Highway** OPMI OTP	Ongoing	Short term	SAI2.1; 1.3

Safety Problem Statement 2

Massachusetts traffic fatalities and fatality rates rose between 2019 and 2022, but have since begun trending downward.

Table 5.2 Safety Action Items—Problem Statement 2

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI2.1 Back-casting toward Vision Zero. In line with the "back-casting" approach (identifying the actions closest to the achievement of a long-term target) MassDOT will define a series of actions working backwards from zero long-term fatalities and serious injuries on all roadways in Massachusetts and implement those activities. Among other initiatives, this will involve the continued data-driven implementation of systemic improvements and intersection safety interventions prioritizing areas with the highest crash rates with a focus on social and geographic equity.	Capital Planning Policy and Program	**Highway** OTP OPMI	Ongoing	Short term	SAI1.1; 1.3; 1.4

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI2.2 Funding towards areas driving high fatality rates. MassDOT will direct funding to locations and crash types driving increased serious injury and fatal crash rates. Specifically, Highway Safety Improvement Program (HSIP) funding will continue to be put toward infrastructure investments that mitigate the types of crashes driving the increasing number of fatalities, including crashes involving speeding and lane departures.	Capital Planning	**Highway**	Ongoing	Short term	SAI1.1; 2.3; 3.3 SCTAI1.1
SAI2.3 Systematically invest in and deploy low-cost interventions with proven safety benefits. MassDOT will continue to partner with communities in top-risk areas to advance systemic safety improvements, as documented in the 2023 *Strategic Highway Safety Plan*.	Capital Planning	**Highway**	Ongoing	Mid term	SAI1.1; 2.1; 2.2; 2.4; 3.3 SCTAI1.1
SAI2.4 Develop Capital Freight Program. MassDOT will develop a dedicated Freight Program within its *Capital Investment Plan* (CIP) and State Transportation Improvement Program (STIP) to fund projects eligible for National Highway Freight Program (NHFP) formula funds, including but not limited to truck parking facilities, intelligent freight transportation systems, weigh-in-motion stations, and infrastructural safety improvements.	Policy and Program	**Highway** **OTP** RTD Aeronautics RMV	New	Short term	SAI2.3; 3.3; SCTAI1.3; 1.4 RSAI1.7; 3.1; 3.2
SAI2.5 Vehicle design. Consistent with the SHSP, MassDOT will take an active role in affecting change in vehicle design (e.g., vehicle size, use of sideguards), which is a significant factor for injuries sustained in the instance of a crash. In the short term, this analysis will include a review of the impacts of electric vehicle specifications including weight on crash severity.	Research	**Highway** RMV	New	Mid term	
SAI2.6 Automated enforcement pilots. In coordination with select municipal partners, MassDOT will pilot automated enforcement technologies to enforce traffic violations for running red lights and speeding, and develop recommendations for the Massachusetts Legislature's approval. As part of this pilot, it is essential that social equity is accounted for to prevent existing enforcement disparities and that safety (rather than revenue generation) be the sole purpose for implementing automated enforcement technology.	Policy and Program Research	**Highway** **OTP**	New	Short term	SAI2.3; RAI2.2

Safety Problem Statement 3

Users of active transportation modes, namely walking and bicycling, often experience unsafe, low-comfort, and disconnected facilities, especially in Gateway Cities and rural areas. Older

adults are particularly vulnerable to serious injury or death when they are involved in crashes as pedestrians.

Table 5.3 Safety Action Items—Problem Statement 3

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI3.1 Sidewalk and bicycle facility gaps. Building on MassDOT's Next Generation Bicycle/Pedestrian Vision mapping effort, MassDOT will continue to identify the gaps in sidewalk and bicycle facility coverage that contribute to crashes and prioritize funding to address these gaps. For example, in line with recent research that finds a correlation between gaps in sidewalk coverage and pedestrian crashes, MassDOT will continue to develop and prioritize an inventory system of the bike and sidewalk networks throughout the Commonwealth while accounting for facility condition and ADA accessibility issues, with a priority on Gateway Cities and rural areas.	Research Capital Planning	**OTP** Highway OPMI	New	Short term	SAI1.1; 3.2 SCTAI1.1 DCAI2.2 TEA4.2
SAI3.2 Sidewalk performance measures for Tracker. MassDOT will explore the development of performance measures for "miles of priority sidewalk gaps in EJ areas" and "miles of priority sidewalk gaps within a one-half mile of transit" for incorporation into Tracker, as well as measures regarding the maintenance of crosswalk markings.	Research	**OPMI**	New	Short term	SAI1.3; 3.1 TEA4.2
SAI3.3 Speed management and traffic calming. Consistent with the 2023 SHSP, MassDOT will continue to identify opportunities to introduce traffic calming measures to high-risk corridors and intersections and add to its resources for speed management interventions. MassDOT will also explore 'dementia-friendly' design considerations presented by the Massachusetts Executive Office of Elder Affairs.	Policy and Program Capital Planning	**Highway** OTP	Ongoing	Short term	SAI1.1; 2.2; 2.3; 2.4 SCTAI1.1

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI3.4 Prioritizing maintenance activities. MassDOT will prioritize maintenance efforts in line with identified best practices. For example, maintenance activities such as snow removal from bike lanes and sidewalks and installing more visible pavement markings will be advanced. Additional training and educational opportunities will be provided to MassDOT employees in these areas, and municipal agreements regarding these kinds of maintenance activities will be pursued.	Operations Capital Planning Research	**Highway** **OTP**	New	Mid term	SAI1.1 SCTAI1.1 DCAI2.1; 2.2; 3.1 RSAI1.4

Safety Problem Statement 4

Residents perceive an unsafe environment on public transportation due to a combination of high-profile crashes and other safety events, as well as personal experience.

Table 5.4 Safety Action Items—Problem Statement 4

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI4.1 Presentations on safety progress. MassDOT, in collaboration with the MBTA and the Massachusetts Association of Regional Transit Authorities (MARTA), will consistently present updates to safety data to the public and other stakeholders on progress made in addressing safety concerns such as escalators and other stop or station facility improvements, disabled trains and buses, and the expansion of positive train control (PTC).	Research Partnerships	**MBTA** **RTD**	New	Short term	SAI4.2; 4.3
SAI4.2 Steps from MBTA safety plan. As documented in the MBTA's *3-Year Safety Improvement Plan* in response to the Federal Transit Administration's Safety Management Inspection (SMI), the MBTA will continue to take several steps to achieve its safety objectives, including operational improvements as well as Capital Transformation Program safety-related projects. Progress toward these action items will be tracked on the MBTA's FTA SMI Response Dashboard.	Capital Planning Operational Improvements	**MBTA**	Ongoing	Short term	SAI1.4
SAI4.3 Organizational changes. MassDOT and the MBTA will continue to make organizational changes that involve the oversight of safety activities to ensure a safe and healthy transportation system for all employees, passengers, and the public across all modes of transportation.	Operational Improvements	**MBTA** **MassDOT Highway**	Ongoing	Short term	SAI1.4 RAI1.3

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI4.4 Station and vehicle safety improvements. The MBTA and RTAs will work to ensure that all stations, vehicles, and right of way (including pedestrian access points) are adequately lit, regularly serviced and staffed by transit agency staff, and have operating security features like cameras and emergency call boxes.	Capital Planning Operational Improvements	**MBTA** **RTD**	Ongoing	Mid term	TEA1.3; 3.1

Safety Problem Statement 5

There is limited safety-related knowledge or guidance on certain issue areas, like driver's education in autonomous vehicles, the application of unmanned aerial systems for improved safety outcomes, or the impacts of limited cellular service on emergency responsiveness or real-time transit vehicle tracking.

Table 5.5 Safety Action Items—Problem Statement 5

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI5.1 RMV guidelines. MassDOT's RMV will perform a formal review of and update the driver's education curricula to promote road safety by educating bicyclists, pedestrians, and motorists to be aware of their actions as they travel.	Policy and Program	**RMV** Highway OTP	New	Short term	SAI5.2; 5.4
SAI5.2 Driver education content. MassDOT will update the driving school topic list to include new material like stopping distances when operating at higher speeds and/or on high-speed roads, as well as road user education on visibility around trucks, bicycles, and school buses; the operation of autonomous vehicles and other emerging technologies; adherence to new vulnerable road user laws; increasing fatigue awareness; and continuing efforts to reduce distracted diving and control the use of handheld electronic devices while driving.	Policy and Program	**RMV** Highway OTP	New	Short term	SAI5.1; 5.4
SAI5.3 Research on emerging technologies. MassDOT will continue to study emerging technologies such as automation and Artificial Intelligence (AI) and their impacts on, and utility for, transportation safety. For example, MassDOT will continue to dedicate significant resources towards research efforts in partnership with the University of Massachusetts Transportation Center (UMTC) to develop reports on driver safety topics including but not limited to site identification, traffic monitoring and emergency response, the effect of advanced driver assistance systems (ADAS) on road safety, autonomous vehicles, and the calibration of safety performance functions and features for urban and suburban intersections.	Research	**Highway** OTP RTD MBTA	Ongoing	Mid term	RSAI1.6

Action Items	Category	Division(s)	Status	Timeframe	Related
SAI5.4 Education resources for new drivers. MassDOT will develop new driver education resources, materials, and public awareness campaigns around emerging safety issues like speeding and new transportation technologies.	Policy and Program	**RMV** Highway OTP	New	Short term	SAI5.1; 5.2
SAI5.5 UAS for Safety Assessments. MassDOT's Aeronautics Division will explore opportunities for tools like unmanned aerial systems (UAS) to improve worker safety, disruptions, and improve data quality for asset management purposes.	Policy and Program	**Aeronautics**	New	Mid term	RSAI1.6

5.3 Reliability

Ongoing Reliability Efforts

MassDOT and its partner agencies are actively involved in ensuring its operational activities and funding programs improve the reliability of the transportation network, meaning that users can feel confident in the travel conditions they are expecting at any given time. MassDOT's six Highway District offices and the MBTA's Operations Control Center continually manage day-to-day issues impacting operations. Specific examples of initiatives designed to improve travel time reliability include MassDOT's Local Bottleneck Reduction Program, which funds solutions to address congestion bottlenecks on local roadways to improve traffic flow, as well as MassDOT's Mobility Dashboard, a regularly updated roundup of key indicators that reflect how much people are traveling, how they are getting around, and where they are going.

MassDOT's 2019 *Congestion in the Commonwealth* report and 2023 *Freight Plan* each established a baseline for the challenges and impacts associated with congestion in the state for passenger vehicles, freight, and transit trips, chiefly that the network is largely unreliable and users cannot be confident in the amount of time their trips will take or the associated opportunity costs. This unreliability limits Massachusetts' attractiveness to companies large and small, as both employers and commercial entities. MassDOT understands the implications of unreliable conditions and, since the publication of the congestion report, has taken significant steps to address network reliability in terms of both vehicular congestion and transit service provision. These steps include, but are not limited to, new tools to manage state and roadway operations, reinvention of bus transit at both the MBTA and RTAs, transit signal priority including Tobin Bus Lanes and the Lynnway, and increasing MBTA capacity and ridership through safety and maintenance prioritization efforts.

Additionally, the MBTA's *2024–2028 Capital Investment Plan* (CIP) includes more than 300 critical reliability projects to inspect, repair, and upgrade stations, tracks, bridges, tunnels, signals, power, and IT infrastructure and components. Additional detail on what is required to achieve a state of good repair on the MBTA system is included in the MBTA's *Capital Needs Assessment and Inventory* (CNAI). The CNAI is an MBTA-led analysis conducted every three to four years to inventory the MBTA's assets, understand the overall condition of the transit system, and identify assets that are not in a state of good repair in order to determine the level of investment needed to support the existing network. Understanding the MBTA's state of good repair needs and the level of investment required to address them is a critical step toward improving the system. The MBTA is currently working to incorporate the findings of the CNAI into the capital project pipeline.

MassDOT's Highway Division has a *Transportation Asset Management Plan* (TAMP) that describes plans and progress for long-term state of good repair for pavement and bridge assets based on a risk-based asset management plan. State of good repair impacts reliability in many ways, including emergency repair construction, restrictions, and bridge closures. Currently Massachusetts is one of a handful of states falling short of the Federal minimum condition threshold, requiring an increase in investment to state of good repair activities and inhibiting investment in system modernization and expansion. This requirement will be accounted for when determining funding levels for a variety of relevant future actions.

MassDOT's Aeronautics Division uses advanced tools to translate drone data into analytical products that enhance the reliability of management and operations, drive shorter project life cycles, and reduce costs. The Aeronautics Division is exploring options for battery- and hydrogen-powered aircraft and evaluating the best way to integrate AAM into surface, rail, and maritime modes to optimize our existing transportation system.

Reliability Action Items

Reliability Problem Statement 1

Massachusetts travelers by any mode experience congestion, resulting in low confidence about the conditions they will encounter and diminished access to everyday needs.

Table 5.6 Reliability Action Items—Problem Statement 1

Action Items	Category	Division(s)	Status	Timeframe	Related
RAI1.1 Initiate projects flowing from prior planning studies and reports on travel time reliability. MassDOT will investigate opportunities to execute the recommendations outlined in its planning studies and reports, including but not limited to the *Managed Lanes Screening Studies, Route 128/I-95 Land Use and Transportation Study, Congestion in the Commonwealth*, and Shared Travel Network analysis.	Operational Improvements Capital Planning	**Highway** OTP	New	Short term	RAI1.5;1.6; 2.1; 3.1 DCAI1.1; 1.5
RAI1.2 Rapid transit delays. The MBTA will continue to address systemic issues that affect delay along rapid transit lines according to strategic plans developed by the General Manager and Chief Operating Officer.	Operational Improvements	**MBTA**	Ongoing	Short term	RAI1.4; 2.1; 2.3 DCAI4.2
RAI1.3 Communications. The MBTA will continue efforts to keep the public apprised of project status and timelines and expected returns to normal service delivery so riders can better plan their trips.	Operational Improvements	**MBTA**	Ongoing	Short term	SAI4.3

Action Items	Category	Division(s)	Status	Timeframe	Related
RAI1.4 Roadway bottlenecks and delay. The Highway Division will continue its efforts to prioritize locations within the roadway network that are prone to bottlenecks and delay and deploy site-specific mitigation projects.	Capital Planning	**Highway**	Ongoing	Short term	SAI1.1 RAI1.1 DCAI1.1
RAI1.5 Roadway pricing study. MassDOT will study roadway pricing with a focus on the transit capacity needed for success as well as implications of roadway pricing on vehicle miles traveled (VMT), while accounting for social and geographic equity.	Research	**OTP** Highway Division	New	Short term	RAI1.1
RAI1.6 Regional rail services. The MBTA will continue to explore options to expand its regional rail services in response to changing travel patterns and behaviors, and be proactive in executing the recommendations codified in the *Rail Vision* report. Similarly, RTD will continue efforts to develop Compass Rail.	Capital Planning	**MBTA** **RTD** OTP	Ongoing	Short term	DCAI3.3; 5.1
RAI1.7 Program for Mass Transportation (PMT) Development. MassDOT and the MBTA will complete the next Program for Mass Transportation, ensuring that transit capital plans align with *Beyond Mobility*, other statewide plans, and goals from the MBTA *Strategic Plan*.	Policy and Program	**MBTA** **OTP**	Ongoing	Short term	N/A
RAI1.8 Pavement and bridge reliability improvements. MassDOT's Highway Division will continue to address state of good repair issues that affect reliability along roadways according to MassDOT TAMP recommendations.	Operational Improvements	**Highway**	Ongoing	Short term	RAI1.9
RAI1.9 Expand roadway asset management activities. MassDOT will develop a plan for expanding asset management activities to include additional assets, including the condition of sidewalks and bicycle facilities as well as safety treatments to improve reliability.	Capital Planning Research Operational Improvements	**Highway** OTP	New	Short term	RAI1.8

Reliability Problem Statement 2

Roadway congestion diminishes the reliability of public transit bus service, limiting its attractiveness and competitiveness.

Table 5.7 Reliability Action Items—Problem Statement 2

Action Items	Category	Division(s)	Status	Timeframe	Related
RAI2.1 Roadway investments for transit reliability. MassDOT, the MBTA, and RTD will continue to coordinate with other transit providers, municipalities, and partner agencies during project development to identify and support potential roadway investments that will improve transit reliability. At the MBTA, this work will build upon the existing Bus Priority Vision and Toolkit initiative. MassDOT will also develop guidelines for municipalities and transit agencies on the design and implementation of bus lanes and other transit-priority infrastructure to ensure its placement accounts for all modes and does not diminish safety.	Partnership and Engagement	**Highway** **MBTA** **OTP** RTD	Ongoing	Short term	RAI1.1; 1.2; 1.4; 2.3 DCAI2.1; 4.2; 5.1
RAI2.2 Enforcement of traffic violations. MassDOT and the MBTA will coordinate with municipalities and other state agencies including the State Police to encourage and facilitate stricter enforcement of traffic violations involving transit-priority infrastructure, such as driving or parking in designated bus lanes, and will pursue statewide authority for automated enforcement of bus stops and bus lanes.	Partnership and Engagement	**OTP** **MBTA** Highway RMV Legislative Affairs	New	Short term	N/A
RAI2.3 Funding program for transit priority projects. MassDOT will work with the MBTA, RTAs, and municipalities to expand access to transit-priority infrastructure for the state's transit riders that reduces delay due to congestion. These projects will be formalized within a dedicated funding program for transit-priority projects on municipal roadways to improve reliability and competitiveness of transit.	Policy and Program Capital Planning	**Highway** **OTP** RTD	New	Short term	RAI1.2; 2.1 DCAI2.1; 4.2; 5.1

Reliability Problem Statement 3

Congestion and freight bottlenecks impact the efficient movement of goods, which drives up labor costs, lowers capital productivity, and often results in higher costs for households and businesses.

Table 5.8 Reliability Action Items—Problem Statement 3

Action Items	Category	Division(s)	Status	Timeframe	Related
RAI3.1 Infrastructure projects. Using existing funding resources and consistent with MassDOT's 2023 *Freight Plan* update, MassDOT will invest in infrastructure improvements that improve the flow of freight travel, including maintaining uncongested last-mile access to freight-generating facilities, resolving identified truck bottlenecks, and using critical freight corridors to support projects that improve multimodal freight mobility.	Capital Planning	**Highway** OTP RTD Aeronautics	New	Mid term	SAI2.4 RAI1.1; 3.2 SCTAI1.4
RAI3.2 Multimodal freight movement. MassDOT will continue to explore and support investments in innovative multimodal freight movement opportunities like Advanced Air Mobility (AAM) that may improve reliability of freight travel and reduce the negative externalities of existing transportation systems.	Policy and Program	**Aeronautics** RTD Highway	Ongoing	Short term	SAI2.4 RAI3.1 SCAI1.3
RAI3.3 Coordination with Rail-Based Freight Providers. MassDOT's Rail and Transit Division will continue to coordinate with rail-based freight transportation providers that own railroads to improve collaboration with the goal of reducing the delay of passenger rail service that operates on freight lines.	Operational Improvements	**RTD**	Ongoing	Short term	

5.4 Supporting Clean Transportation

Ongoing Clean Transportation Efforts

In line with the Global Warming Solutions Act (as amended by An Act Creating A Next-Generation Roadmap for Massachusetts Climate Policy), and as referenced in Massachusetts' *Clean Energy and Climate Plan for 2025/2030* (CECP), the Commonwealth of Massachusetts has set transportation greenhouse gas sub-limits for 2025, 2030, and 2050 at 18 percent, 34 percent, and 86 percent below the 1990 level, respectively. The statewide emissions limit for 2050 was set at Net Zero, defined as "A level of statewide greenhouse gas emissions that is equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided, however, that in no event shall the level of

emissions be greater than a level that is 85 percent below the 1990 level." The sector-specific emissions sublimits add up to an emissions reduction level that is slightly above the required statewide 85% GHG emissions reduction target.

MassDOT is committed to realizing the transportation sector sublimits established in the CECP by 2050 through the actions described in this section. The CECP spells out the most impactful actions that can be taken to achieve these targets. For transportation, these actions include electrification of both transit and personal vehicles through major investments in charging infrastructure, as well as making streets more complete, among others. MassDOT and the MBTA actions support the achievement of reducing GHG emissions in the transportation sector. For example, in 2022 MassDOT completed the *National Electric Vehicle Infrastructure Deployment Program Plan* to expand the supply of electric vehicle (EV) highway fast-charging stations serving long-distance travel corridors in Massachusetts.

The MBTA's *2024–2028 Capital Investment Plan* (CIP) supports the MBTA's Bus Electrification Strategy to achieve full bus electrification by 2040 through the modernization of major bus facilities to provide capacity for electrification, the continued conversion of bus fleet to zero-emissions technology, and the procurement of battery electric buses (BEBs), among other investments. The MBTA's CIP also supports the MBTA's commitment to the first phase of Regional Rail Transformation through key electrification investments. In a similar vein, MassDOT's Rail and Transit Division (RTD) is continually providing the Commonwealth's fifteen RTAs with opportunities for zero-emission fleet transition.

MassDOT RTD's electrification initiatives have included, but are not limited to, analyses of the potential for zero-emission bus and battery electric bus deployment, Federal discretionary grant coordination to assist RTAs in winning Federal grants for low- and no-emission vehicles, incentive programs, partnerships with other state agencies, as well as capital investments in electrification across a variety of different programs. From 2015 to 2022, MassDOT has supported the replacement of 24 diesel-powered buses with BEBs through the CIP process. Additionally, MassDOT RTD's Community Transit Grant Program (CTGP) has recently added EVs as an eligible vehicle type, with the first EV projects delivered in June of 2023.

In October 2023, Massachusetts Climate Chief Melissa Hoffer published a report with recommendations to implement the Healey-Driscoll Administration's whole-of-government approach to addressing the climate crisis. MassDOT and the MBTA are continuing to coordinate with the Governor's office and Climate Chief's office to implement applicable recommendations. For example, MassDOT participated in the development of the *Massachusetts Climate Report Card* to inform residents of progress toward achieving the CECP's mandates, and is in the process of establishing a Climate Project Management Office (PMPO) to fully operationalize climate work into the structure of MassDOT. An additional *Beyond Mobility* Action Item has been added below to address other items within the Climate Chief's report.

Other ongoing efforts that support clean transportation at MassDOT include the Bicycle and Pedestrian Programs in MassDOT's *Capital Investment Plan*, which funds tens of millions of dollars of projects over five years to improve bicycle and pedestrian infrastructure in line with MassDOT's vision and goals adopted as part of MassDOT's *Bicycle Plan* and *Pedestrian Plan*. Additionally, the MassTrails Grant Program provides grants to communities, public entities and non-profit organizations to plan, design, create, and maintain a diverse network of trails.

The Aeronautics Division is also exploring how advanced aviation air vehicles, such as battery- or hydrogen-powered aircraft can reduce aviation's carbon footprint. The Aeronautics Division is also exploring options for clean power infrastructure such as electric charging stations and independent power generation systems (microgrids).

Supporting Clean Transportation Action Items

Supporting Clean Transportation Problem Statement 1

Transportation is the largest contributor of Massachusetts' carbon emissions and transportation-related emissions are disproportionately concentrated in Environmental Justice communities.

Table 5.9 Supporting Clean Transportation Action Items—Problem Statement 1

Action Items	Category	Division(s)	Status	Timeframe	Related
SCTAI1.1 Complete streets. MassDOT will expand programs that make the Commonwealth's streets more complete. Specifically, Federal Carbon Reduction Program (CRP) apportionment may be used to provide additional construction project funding for MassDOT's Complete Streets and Safe Routes to Schools (SRTS) Programs to advance projects. Eligible projects will include new or expanded pedestrian and bicycle facilities, traffic calming, intersection redesign, transit improvements, streetscape investments, and more.	Capital Planning	**OTP** Highway RTD MBTA	New	Short term	SAI1.1; 2.2; 2.3; 3.1; 3.3; 3.4 RAI1.4 DCAI2.1; 2.2; 3.1; 3.2 TEAI2.2; 4.2
SCTAI1.2 Bus and other transit electrification. Consistent with MassDOT's *Carbon Reduction Strategy* and Phase II of the *Zero-Emission Bus/Battery Electric Bus Implementation Plan* as well as the *Massachusetts Clean Energy and Climate Plan,* MassDOT and the MBTA will support the electrification of public transit buses alongside similar initiatives in paratransit and Commuter Rail services. Specifically, Federal CRP funding may be used to procure zero-emission public transit MBTA and RTA buses and charging infrastructure for the MBTA's Bus Modernization program and other RTA initiatives. Hydrogen-fueled buses and vehicles will also be procured as part of this work.	Capital Planning	**MBTA** **RTD** OTP	Ongoing	Short Term	SCTAI2.2
SCTAI1.3 Freight greenhouse gas emissions. Consistent with the *Massachusetts Freight Plan*, MassDOT will support policies to reduce greenhouse gas emissions from freight vehicles.	Policy and Program	**OTP** Highway RTD Aeronautics	New	Short term	SAI2.4 RAI3.1 SCTAI1.4; 1.5

Action Items	Category	Division(s)	Status	Timeframe	Related
SCTAI1.4 Equity in freight projects. MassDOT will establish a framework for prioritizing multimodal freight projects with a focus on equity, such as better understanding the proximity and impacts of freight infrastructure including truck emissions, warehousing and intermodal facility siting, refueling centers, and other sites to and on Environmental Justice communities.	Policy and Program	**OTP** **Highway** **RTD** Aeronautics	New	Mid term	SAI2.4 RAI3.1 SCTAI1.3
SCTAI1.5 Addressing recommendations in the Climate Chief's report. The Massachusetts Climate Chief's report released in October 2023 included several items relevant to MassDOT and the MBTA, including calls for new analyses, initiatives, and operational changes to make progress toward Massachusetts' long-term climate goals. MassDOT will coordinate with the Massachusetts Office of Climate Innovation and Resilience to ensure all applicable actions move forward.	Research Capital Planning	**OTP** **Highway** **MBTA** **RTD** **Aeronautics**	New	Mid term	SCTAI1.3

Supporting Clean Transportation Problem Statement 2

Availability of suitable infrastructure is a potential barrier to low-emission transportation choices.

Table 5.10 Supporting Clean Transportation Action Items—Problem Statement 2

Action Items	Category	Division(s)	Status	Timeframe	Related
SCTAI2.1 EV Alternative Fuel Corridors. By implementing the MassDOT *NEVI Plan*, MassDOT will eliminate all gaps greater than 50 miles between 4x150kW fast charging stations on the Federally designated EV Alternative Fuel Corridor network. Federal NEVI Program and CRP funding may be used to support this effort, with the goal of ensuring drivers of personal and commercial vehicles have ease of access to charging on all designated Alternative Fuel Corridors.	Capital Planning	**Highway**	New	Mid term	
SCTAI2.2 Projects to support electrification. The MBTA will continue to invest in projects that support system electrification, building on its most recent CIP, which includes over 20 projects that support fleet, facilities, and energy asset upgrades to support electrification.	Capital Planning	**MBTA**	Ongoing	Mid term	SCTAI1.2

Action Items	Category	Division(s)	Status	Timeframe	Related
SCTAI2.3 Sustainable aviation fuels. MassDOT Aeronautics will continue to work with the US Department of Energy and other state partners on funding strategies to bring sustainable aviation fuels to the Northeast and make them available to operators.	Policy and Program	**Aeronautics**	Ongoing	Mid term	
SCTAI2.4 Modernizing power infrastructure and energy procurement and generation. MassDOT and the MBTA will coordinate with other state departments (including the Executive Office of Energy and Environmental Affairs) and utility providers to support grid modernization, which is a critical effort to ensure that the Massachusetts electric grid is sufficient to support the degree of electrification required to meet the Commonwealth's electrification goals.	Capital Planning	**Highway MBTA OTP**	Ongoing	Short term	SCTAI1.2 SCTAI2.2

5.5 Destination Connectivity

Ongoing Destination Connectivity Efforts

In the spirit of the idea that transportation is more important for what it *does* than for what it *is*, MassDOT and the MBTA are involved in a number of initiatives that promote access to and from critical destinations that provide opportunities—economic opportunity, educational opportunity, and healthcare opportunities, among others. For example, the MBTA and MassDOT's Rail and Transit Division manages several programs providing access to opportunities using both formula and discretionary funding sources. MassDOT's competitive programs in this area include the Community Transit Grant Program (CTGP), which expands mobility for older adults and people with disabilities, and the Regional Transit Innovation Grant Program, which promotes transit improvements at RTAs and supportive transit improvements across the Commonwealth. Additionally, MassDOT's "Compass Rail" initiative calls for new intercity passenger rail routes that connect north-south routes through the Connecticut River Valley with east-west routes from Albany to Boston, with Springfield as the hub of the compass. As of the time of this plan (in June 2024), the following reflects the latest status of the Compass Rail Initiative:

- Preliminary engineering and environmental review for the Springfield Area Track Reconfiguration Project is ongoing with completion expected in spring 2025 ($1.75 million in FY 2021 Federal Railroad Administration CRISI grant funding).
- Springfield Area Track Reconfiguration Project final design application submitted to FY23-24 FRA's CRISI program; under review. ($36.8 million request, $9.2 million match)
- Progress is being made in the Early Actions for the Inland Route project ($108 million FY22 FRA CRISI). The foundational service model was completed in March 2024, and the infrastructure to be designed/constructed was identified in May.

- Boston & Albany Corridor accepted into FRA Corridor ID Program.
- State-funded Palmer Station Planning and Design is underway ($4 million).
- State-funded Pittsfield Track Capacity Improvements ($8 million) planning is underway. Design and construction to follow.
- Designer is being solicited for West Springfield Grade Crossing Elimination project.

Additionally, MassDOT has consistently been working with Amtrak and CTDOT to implement new service schedules that have resulted in an additional Northeast Regional round trip between Springfield and New York City, an additional CTrail trip between Springfield and New Haven, and better-positioned Valley Flyer trains. Ridership continues to exceed forecasts and break previous records, demonstrating strong demand for passenger rail in Western Massachusetts. MassDOT is also studying the potential to implement passenger rail service from North Adams to Greenfield and Boston (also known as the Northern Tier), with the speed, frequency, and reliability necessary to be a competitive option for travel along this corridor.

At the MBTA, a number of ongoing initiatives and projects address the important role the MBTA plays in allowing residents to access critical destinations. In addition to the agency's CIP, which funds a great deal of infrastructure projects to advance reliability and safety across all MBTA lines and modes, other MBTA initiatives in this area include but are not limited to the Better Bus Project, the Bus Network Redesign, and the Bus Priority Vision and Toolkit resources to expand bus priority within the MBTA's service area. Additionally, the future Silver Line Expansion from Chelsea through Everett toward Sullivan Square and potentially beyond is an example that represents the MBTA's work coordinating with municipalities to expand service and provide critical connections between destinations. The numerous service and infrastructure improvements currently underway, in development, or planned by the MBTA, MassDOT, and municipalities will enhance the competitiveness of transit relative to single-occupancy car travel.

From the standpoint of roadway and active transportation initiatives, MassDOT's Complete Streets Program provides municipalities funding, technical assistance, and training to bridge gaps in the multimodal transportation system using street and intersection redesigns, traffic calming, pedestrian crossing modifications, bicycle and pedestrian network connections, and transit investments. As of 2023, 260 municipalities have adopted Complete Streets policies, 243 municipalities have developed Complete Streets prioritization plans, and over 250 capital funding awards have been granted. MassDOT's Safe Routes to School (SRTS) Program also funds projects that promote access to education for the Commonwealth's K-12 students. Over 70 SRTS infrastructure projects have been completed in Massachusetts to date, and over 1,000 schools throughout Massachusetts are SRTS partners.

Other funding programs that promote multimodal accessibility include the MassTrails Program (in partnership with the Massachusetts Department of Conservation and Recreation and other partners) and the MassDOT Shared Use Path Program in the *Capital Investment Plan*. Additionally, MassDOT's Bicycle and Pedestrian Program within the *Capital Investment Plan* is both informed by MassDOT's *Bicycle Plan* and *Pedestrian Plan* as well as data sources such as the Potential for Everyday Walking and Bicycling. Additionally, the Highway Division's Engineering Directives and design guidelines require project proponents to include bicycle, pedestrian, and transit infrastructure

as part of all projects MassDOT oversees, ensuring that infrastructure is as safe and connected as possible for all users of the transportation system. The criteria MassDOT uses to select projects also include factors related to access to destinations.

Additionally, MassDOT planning studies increasingly address the housing and land use contexts of our network operations. The recent Route 128/I-95 study is a call to urgency around this issue, as transportation challenges are often not borne by the network itself, but by the land use context in which it operates. For example, the recent Route 128/I-95 Land Use and Transportation Policy found that just 500 out of 56,000 employees in a high-density Waltham research and lab use environment live near where they work and that 60 percent of all its workers live at least ten miles away. Of the 7,000 people that live in the study area, 92 percent commute out of it to go to work. When people are unable to live near where they work—and housing costs and vacancy rates being what they are—they often incur significant commutes, which are further exacerbated by limited transit options, all of which limit people's ability to get places. This is the case in many of the key employment centers throughout the state, which are burdened by the effects of many commuters using the same roads to get to the same places around the same times. While MassDOT supports the growth in commercial enterprises throughout the state, many analyses support the need to simultaneously expand housing opportunities—especially high-density units—in areas of economic significance.

This plan acknowledges and accounts for the vast diversity in land use types and community contexts across the state. From Williamstown to Wellesley to Wellfleet, Massachusetts has it all, from farmlands to beachside resorts, and the hum of the Financial District to the lull of the salt marshes. We know that different parts of the state have different needs and challenges and are committed to implementing flexible policies and strategies to be responsive to these differences. Many significant issues are raised in the Rural Policy Plan that was released in 2019, including concerns around public transit provision and affordability in lower-density parts of the state. We look forward to working with many stakeholders in Berkshire, Franklin, Hampden, and Hampshire counties on opportunities to execute on the action items in rural areas, as described in this Plan.

Destination Connectivity Action Items

Destination Connectivity Problem Statement 1

People living in Environmental Justice communities are burdened by connectivity inequities across our transportation system, limiting their access to opportunities.

Table 5.11 Destination Connectivity Action Items—Problem Statement 1

Action Items	Category	Division(s)	Status	Timeframe	Related
DCAI1.1 Commute time disparities. MassDOT will further study where the greatest disparities in commute time are across different demographic groups, and coordinate with transit providers and municipalities to consider service and network changes that reduce these disparities, including bus-only lanes, regional rail expansion, and other transit prioritization techniques. A focus on qualitative data on people's lived experiences will be part of this analysis.	Research Operational Improvements	**OPMI** OTP Highway MBTA RTD	New	Mid term	RAI1.1; 1.4; 1.5 DCAI1.2; 2.1; 2.2; 3.1; 3.2; 3.3; 4.1
DCAI1.2 Tracker metrics for destination connectivity. MassDOT will explore adding performance metrics on access to destinations to Tracker. These metrics will include the number of critical destinations and essential services accessible by different modes including micromobility and demographic groups including disability status across different times of day.	Research	**OPMI** OTP	New	Short term	SAI1.3 DCAI1.1
DCAI1.3 Options for people who are low income or who have disabilities. MassDOT will explore opportunities to use discretionary funds to support expanding employment transportation to low income individuals and people with disabilities. MassDOT will work with the Executive Office of Labor and Workforce Development (EOLWD) to set up this program.	Policy and Program	**OTP** RTD	New	Mid term	TEA3.5; 3.6

Destination Connectivity Problem Statement 2

The lack of contiguous, safe, high-comfort bike or pedestrian pathways connecting existing pedestrian and bicycle facilities limits the ability of people walking, bicycling, and using other non-motorized modes, including mobility-assistive devices, to access critical destinations.

Table 5.12 Destination Connectivity Action Items—Problem Statement 2

Action Items	Category	Division(s)	Status	Timeframe	Related
DCAI2.1 Funding program for multimodal transit connections. MassDOT will create a new program (either as part of the *Capital Investment Plan* or as a state-funded grant program) intentionally prioritizing a list of non-vehicular modernization projects. This program could potentially start with projects on state-owned roadways that contain MBTA or RTA stops (including flag stops) or stations to promote access to transit and ADA accessibility. Environmental Justice communities where there are network gaps referenced in the NextGen Bike/Pedestrian Vision initiative, high potential for everyday walking and bicycling and that contain transit stops, and that receive less investment dollars than other places will be prioritized as part of this framework.	Policy and Program	**Highway** OTP RTD MBTA Aeronautics	New	Mid term	SAI3.4 RAI2.1; 2.3 SCTAI1.1 DCAI1.1; 2.2; 3.1; 3.2; 4.2; 5.1 TEA1.3
DCAI2.2 Shared Use Path Program and MassTrails Grants. MassDOT will continue to encourage applications and provide technical support for the MassTrails grant program in partnership with the Massachusetts Department of Conservation and Recreation, which currently provides funding for both local trails and larger trails that demonstrate network connectivity. These grants are typically used to advance the design of gaps in the shared-use path network as well as improve trail amenities and wayfinding signage. MassDOT will also advance shared use paths through its capital investment planning process.	Partnerships	**Highway** OTP	Ongoing	Short term	SAI3.1; 3.4 SCTAI1.1 DCAI1.1; 2.1; 3.2 TEA1.3; 4.2

Action Items	Category	Division(s)	Status	Timeframe	Related
DCAI2.3 Municipal Sidewalk Program. MassDOT will explore the creation of a new sidewalk formula program for municipalities to support expansion, accessibility, maintenance, and operations (including supporting snow and ice operations) of local networks.	Policy and Program	**Highway** OTP	New	Short term	DCAI3.2, SAI1.1, SAI2.3, SAI3.2, SAI3.4, SCTAI1.1
DCAI2.4 Americans with Disabilities Act (ADA) Transition Plan Update. MassDOT will continue efforts to update its ADA Transition Plan by 2025, which will include a new sidewalk accessibility assessment and updates to MassDOT's curb ramp inventory. This assessment will document (among other items) missing ramps (coordinates of the locations); ADA compliance for each ramp; ramps at driveways; ramp cracking and other defects; and ramp material types.	Policy and Program	**ODCR**	Ongoing	Short term	SAI3.1 DCAI2.1

Destination Connectivity Problem Statement 3

Residents outside of inner core areas across the Commonwealth, particularly those in rural areas, lack convenient transit services and other non-vehicular transportation options and feel disconnected from cultural, economic, and other opportunities. Additionally, current passenger rail service opportunities for the western half of the Commonwealth are extremely limited.

Table 5.13 Destination Connectivity Action Items—Problem Statement 3

Action Items	Category	Division(s)	Status	Timeframe	Related
DCAI3.1 Expand local and regional funding opportunities for destination connectivity purposes. As increased Federal and state funding becomes available, MassDOT will expand existing programs and develop more robust and targeted funding opportunities focused on closing first- and last-mile gaps to fixed route transit, as well as access to healthcare services, employment, and other critical destinations to include more types of transit service through local transportation providers (e.g., municipalities, non-profits, RTAs, and the MBTA). These programs include, but are not limited to, the Community Transit Grant Program and future discretionary grant programs when funding allows.	Policy and Program Capital Planning Partnerships	**RTD** **OTP** MBTA Aeronautics	New	Mid term	SAI3.4 SCTAI1.1 DCAI1.1; 3.2; 4.2; 5.1 TEA1.3
DCAI3.2 First- and last-mile MBTA projects. The MBTA will be directed to seek and spend funds for first- and last-mile purposes. These efforts may involve opportunities to support new microtransit services and advance Transit Improvement Districts to support public-private partnerships. New service in this area will focus on less dense areas within the MBTA service area, promoting access to Commuter Rail stations and other critical destinations.	Policy and Program Partnerships	**MBTA**	New	Mid term	SCTAI1.1 DCAI1.1; 2.1; 2.2; 3.1; 5.1
DCAI3.3 Compass Rail. MassDOT will continue efforts to advance Compass Rail, an expanded intercity rail network, with a defined mission statement, key milestones, and detailed project schedules as projects obtain funding.”	Policy and Program Capital Planning	**RTD**	Ongoing	Short term – mid term	RAI1.7

Destination Connectivity Problem Statement 4

Though the Commonwealth supports reduced vehicle travel as a climate change strategy, people traveling in Massachusetts find it difficult to get around using other modes including transit, cycling, and water transportation.

Table 5.14 Destination Connectivity Action Items—Problem Statement 4

Action Items	Category	Division(s)	Status	Timeframe	Related
DCAI4.1 Vehicle vs. transit accessibility ratios. MassDOT will analyze and compare accessibility outcomes for vehicle versus transit trips to better understand the competitiveness of transit versus private vehicle travel in the interest of improved and more efficient transit service planning.	Research	**OPMI** OTP MBTA RTD Highway	New	Short term	DCAI1.1

Action Items	Category	Division(s)	Status	Timeframe	Related
DCAI4.2 Coordinating bus transit improvements with RTA providers. MassDOT will continue to coordinate with transit providers in Massachusetts to explore opportunities to make targeted improvements in the areas of reliability, frequency, coverage, and on time performance. Specific considerations will include expanding weekend service and increasing frequency overall. For example, RTD is implementing a program focused on transit innovation.	Partnerships Policy and Program	**RTD** OTP Highway	Ongoing	Mid term	RAI1.2; 2.1; 2.3 DCAI1.1; 2.1; 3.1; 5.1
DCAI4.3 Expanded water transportation options. MassDOT and the MBTA will coordinate to expand water transportation options. This expansion of water transportation service will be informed by a *Water Transportation Plan* and emphasize connections from waterfront communities that lack convenient public transportation service to employment centers and other critical destinations.	Policy and Program Research Capital Planning	**MBTA** **OTP**	New	Mid term	DCAI3.1

Destination Connectivity Problem Statement 5

Existing land use patterns reinforce vehicle travel and exclude many Massachusetts residents from having sufficient modal choices.

Table 5.15 Destination Connectivity Action Items—Problem Statement 5

Action Items	Category	Division(s)	Status	Timeframe	Related
DCAI5.1 Identify areas for high-impact transit-oriented investments, both in the MBTA service area and elsewhere in the state. Through geospatial analysis, MassDOT will identify locations that contain high concentrations of households with no vehicle access and high demand for transit in order to prioritize investments and service delivery as well as better coordinate transportation with housing production goals. Outside of the MBTA service area, particular attention in this analysis will be paid to areas where there is existing or planned passenger rail service as part of the Compass Rail initiative.	Research	**OTP**	New	Short Term	RAI1.1; 1.7; 2.1 DCAI3.1; 3.2; 4.2

5.6 Resiliency

Ongoing Resiliency Efforts

MassDOT and its partner agencies are continually involved in evaluating the transportation system's resiliency. Specifically, MassDOT is in the process of developing a Flood Risk Assessment to quantify risks to a range of critical transportation assets, and the MBTA has conducted similar vulnerability assessments across all of its lines and assets. This work will build on the Massachusetts Coast Flood Risk Model (MC-FRM), which display extents and depths of flooding produced for 2030, 2050, and 2070 while accounting for sea level rise due to continued high emissions of greenhouse gases and storm surges associated with coastal storms (hurricanes and northeasters). Additionally, in response to BIL's Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Formula and Discretionary Grant Program, MassDOT's Highway Division has prepared potential candidate projects for the use of this funding.

For integrating resiliency with asset management efforts, MassDOT has incorporated resiliency considerations into its most recent TAMP. Since pavements are susceptible to temperature extremes and fluctuations and given New England's distinct seasonality, MassDOT is committed to improving resiliency through pavement design. Additionally, through its asset management efforts, MassDOT will continue to emphasize routine preservation to ensure pavements are safe for all modal users in any weather conditions, while also able to withstand the challenges of extreme weather. MassDOT's Highway Division has also developed a *Resiliency Improvement Plan* to demonstrate the Division's systematic approach to surface transportation system resilience and how it informs immediate and long range planning activities and investments.

ResilientMass—also known as the is Massachusetts' 2023 *State Hazard Mitigation and Climate Adaptation Plan* (SHMCAP)—is the Commonwealth's initiative for building statewide capacity for climate change adaptation and resilience. It aims to ensure the Commonwealth is prepared to withstand, rapidly recover from, adapt to, and mitigate natural hazard events. MassDOT's Highway Division and the MBTA are two of 29 state agencies included in *ResilientMass*. The *ResilientMass* Action Team (RMAT) is an inter-agency team comprised of representatives from each Secretariat. Both MassDOT and the MBTA submitted actions as part of this effort.

The MBTA's *ResilientMass* actions include work on the agency's Tunnel Flood Mitigation program, begun in 2021, which involves the development of conceptual designs for flood protection of the Alewife Storage Tracks and the Airport Portal. The program is also seeking to address—presently through initial scoping and next into design and construction—upgrades to flood control measures. By protecting portals, the MBTA is seeking to keep coastal flood water out of the transit system. Additionally, the MBTA Office of the Chief Engineer is in the process of updating its design standards for the entire system. The design standards have been drafted to incorporate climate resiliency across all areas. The final design standards will ensure that climate resiliency considerations, such as designing for extreme temperatures, managing stormwater for both improved water quality and resilience, addressing coastal flooding, and designing for high winds, among others, are incorporated into all of the MBTA's design requirements.

Resiliency Action Items

Resiliency Problem Statement 1

Significant transportation infrastructure in Massachusetts is exposed to natural hazards.

Table 5.16 Resiliency Action Items—Problem Statement 1

Action Items	Category	Division(s)	Status	Timeframe	Related
RSAI1.1 High-risk asset identification. MassDOT will continue to identify and address transportation assets that are at risk due to flooding, extreme weather events and storms, and hazards over the coming decades through ongoing analyses and planning efforts. Future capital projects and discretionary grant applications focused on resiliency improvements will address these identified locations, and will identify opportunities to prioritize assets in Environmental Justice communities.	Research Capital Planning	**OTP** Highway MBTA RTD Aeronautics	Ongoing	Mid term	RSAI1.2; 1.4; 1.7; 1.14
RSAI1.2 Project screening for climate risk. MassDOT will enhance project screening through geospatial tools and multi-disciplined project scoping to ensure that infrastructure projects are scoped using the best available information to assess climate risk.	Research	**OTP** Highway MBTA	New	Short term	RSAI1.3; 1.12; 1.14
RSAI1.3 Funding opportunities. MassDOT will take advantage of funding opportunities that are focused on resiliency improvements to address known resiliency issues, including the replacement of undersized culverts, stabilization of roadway embankments and slopes in areas subject to erosion during heavy rain events, and improved drainage systems to manage stormwater more efficiently for improved roadway operational safety and environmental quality.	Capital Planning	**Highway**	Ongoing	Mid term	RSAI1.5; 1.8
RSAI1.4 Comprehensive culvert and drainage inventory and mapping. MassDOT will explore the creation of a culvert inspection program, a culvert replacement and improvement program, as well as develop full inventories of drainage systems and geohazard mapping of ledges and slopes.	Capital Planning Program and Policy	**Highway** **RTD** **MBTA** OTP	New	Short term	SAI3.4 RSAI1.4
RSAI1.5 Resiliency grant program. MassDOT will explore the creation of a state-managed discretionary capital improvements program focused on soliciting resiliency projects from communities based upon vulnerability assessments performed as part of planning grants through the Municipal Vulnerability Preparedness (MVP) program.	Partnerships Policy and Program Capital Planning	**OTP** Highway Division	New	Mid term	RSAI1.1

Action Items	Category	Division(s)	Status	Timeframe	Related
RSAI1.6 UAS for disaster assessment. MassDOT Aeronautics Division will explore the use of unmanned aerial systems (UAS) to assess the impacts of natural disasters on transportation infrastructure and assist in emergency response.	Research	**Aeronautics**	New	Short term	SAI5.3; 5.5
RSAI1.7 Freight system assets. Consistent with the *Freight Plan,* MassDOT will prioritize the protection of freight system assets and operations from climate change and extreme weather impacts.	Capital Planning Policy and Program Research	**Highway** OTP RTD Aeronautics	New	Short term	SAI2.4 RAI3.1 RSAI1.3; 1.14
RSAI1.8 MBTA investments in resiliency. The MBTA will continue to make investments that involve systemwide resiliency benefits, asset hardening, maintenance, and flood protection, building on the most recent CIP. The 2024-2028 CIP contains 70 projects with a nexus to resiliency, a subset of which are projects specifically motivated by resiliency concerns.	Capital Planning	**MBTA**	Ongoing	Short term	RSAI1.1; 1.10; 1.13; 1.16; 1.17
RSAI1.9 Climate change adaptation training and guidance. Invest in internal and external training, including continuation of the fluvial geomorphology based "Rivers & Roads" training program which provides guidance on bridge and culvert design interaction with emerging fluvial geomorphology practices. Coordinate with resource agencies on this effort, as needed. Update existing guidance documents to ensure proposed bridge and culvert projects are appropriately sized. Conduct internal staff training to ensure compliance with the Massachusetts Stream Crossing Standards.	Policy and Program Partnerships	**Highway** OTP	Ongoing	Mid term	
RSAI1.10 Conduct MBTA climate vulnerability assessments. Complete a vulnerability assessment of critical locations across the Commuter Rail system (especially in historic flood locations), and assess the vulnerability of all three major Commuter Rail facilities as well as assets used as part of the RIDE paratransit program. Finish conducting the Cabot Yard Vulnerability Assessment, and complete additional bus facility vulnerability assessments (in coordination with the Bus Modernization Program).	Policy and Program	**MBTA**	Ongoing	Mid term	RSAI1.2; 1.3; 1.8; 1.12; 1.13
RSAI1.11 Implement the Highway Resiliency Improvement Plan. MassDOT's Highway Division will implement its *Resiliency Improvement Plan* in coordination with other agencies as applicable.	Policy and Program	**Highway** OTP	New	Mid term	RSAI1.7; 1.14; 1.15; 1.18

Action Items	Category	Division(s)	Status	Timeframe	Related
RSA1.12 MBTA Design Standards Update. The MBTA Office of the Chief Engineer is in the process of updating its design standards for the entire system. The design standards have been drafted to incorporate climate resiliency in all of the standards. Significant editing and revisions are needed, as well as stakeholder engagement from departments across the MBTA. When this project is complete, the goal is to have climate resiliency considerations (such as designing for extreme temperatures, managing stormwater for both improved water quality and resilience, addressing coastal flooding, and designing for high winds) incorporated into the design requirements. These will be the requirements that all new construction at the MBTA (and retrofits) must adhere to.	Policy and Program	**MBTA**	Ongoing	Mid term	RSAI1.8; 1.10; 1.15
RSA1.13 Resilience improvement prioritization. Screen and prioritize resilience improvements to vulnerable roadway/bridge assets utilizing information from the MassDOT *Resiliency Improvement Plan* evaluation, CAVA, MaPIT, and similar sources. Coordinate with other agencies and engage stakeholders, as applicable, through the project development process. Ensure transparency to communities on the process.	Policy and Program Research	**Highway** OTP	Ongoing	Mid term	RSAI1.2; 1.3; 1.7; 1.11; 1.12; 1.15
RSA1.14 Resilient design research and planning. Research best practices and leading examples of transportation asset resilient designs and standards to inform future MassDOT initiatives and design guidance. Prepare a summary of findings.	Research	**OTP** Highway	Ongoing	Mid term	RSAI1.11; 1.12; 1.13; 1.14
RSA1.15 Tunnel Flood Mitigation Program. The MBTA's Tunnel Flood Mitigation program, which began in 2021, is presently working on conceptual designs for flood protection of the Alewife Storage Tracks and the Airport Portal. The program is also seeking to address upgrades to track dewatering pump rooms. By protecting portals, the MBTA is seeking to keep coastal flood water out. Improving the pump rooms that handle everyday water on the tracks will help mitigate flooding internally. The next steps in this program will be addressing the D Street Portal on the Silver Line in the Seaport (designing flood protection), and addressing flood protection for the MBTA's lowest critical flood locations (especially the ones exposed to coastal flooding in the near term), such as vent shafts, manholes, emergency egresses, etc.	Policy and Program	**MBTA**	Ongoing	Mid term	RSAI1.8; 1.17

Action Items	Category	Division(s)	Status	Timeframe	Related
RSA1.16 Update the MBTA's Emergency Response Plans and GIS viewer for real-time storm response. The MBTA will revise and update its *Severe Weather Operations Plan* as well as its *Snow and Ice Plan* to reflect both the latest climate science and expectations about operating in severe weather. The completion of an updated *Comprehensive Emergency Management Plan* (CEMP) is underway as part of the MBTA's Tunnel Flood Mitigation program. The updated CEMP, which accounts for all climate hazards, will directly inform an update to the *Severe Weather Operations Plan* and *Snow and Ice Plan*. The *Severe Weather Operations Plan* currently in place requires more robust coordination between different MBTA departments, and a verification that the resources that each department says it plans to rely upon will be available in the event of a major storm. Having a GIS viewer for real-time storm response (a deliverable that is part of the Tunnel Flood Protection Program) will help with this coordination and revision of the plans.	Policy and Program	**MBTA**	Ongoing	Short term	RSAI1.8
RSAI1.17 Review TRB's self-assessment tool for project development. Review the Transportation Research Board (TRB)'s self-assessment tool to identify opportunities to incorporate components into the project review process. This will focus on incorporating opportunities for reducing hazards and climate change concerns into the project screening and implementation process.	Policy and Program	**Highway**	New	Mid term	RSAI1.11; 1.12

5.7 Travel Experience

Ongoing Travel Experience Efforts

In the context of *Beyond Mobility*, "travel experience" refers to the ability to use Massachusetts' transportation system with comfort and ease. More specifically, travel experience encompasses asset management considerations (e.g., pavement condition in a roadway context or transit vehicle age in a transit context) as well as various areas that characterize the ease with which the transportation system can be navigated, including affordability, wayfinding, and available trip planning resources, among others.

MassDOT conceives of this "travel experience" as similar to the idea of "user experience"; that is, it represents how someone who uses the transportation system interacts with the system or service. For many, a high-quality travel experience centers on the core functions of a transportation system, including travel that is low-stress, comfortable, consistent, and navigable.

MassDOT and its partner agencies have completed several analyses on—and have made investments in—projects that enhance users' experience of traveling throughout the transportation network in Massachusetts. These efforts have included everything from studying the state of good repair of transportation facilities in Massachusetts through plans like MassDOT's TAMP and *ADA Transition Plan* as well as transit vehicles through transit providers' *Transit Asset Management Plans* to MassDOT's Ride Match initiative, which provides a one-stop searchable directory of public, private and accessible transportation options in Massachusetts. At the MBTA, initiatives such as the means-tested fare program aim to increase access to transit services for low-income riders and efforts to enhance and expand real-time information are also underway.

Travel Experience Action Items

Travel Experience Problem Statement 1

All transit riders, including users of paratransit and human services transportation (HST), deserve a better user experience and increased affordability on transit, in Environmental Justice communities and across the Commonwealth.

Table 5.17 Travel Experience Action Items—Problem Statement 1

Action Items	Category	Division(s)	Status	Timeframe	Related
TEAI1.1 Fare program results. The MBTA will continue to explore expanded access to the Free/Reduced Fare Program for eligible riders with disabilities, older adults, young people and low-income individuals. Decision-makers will proactively engage with options to increase ridership and equity of the MBTA system while maintaining fares as a key source of revenue for the MBTA.	Policy and Program	**MBTA**	Ongoing	Short term	TEAI1.2
TEAI1.2 Fare-free transit options. MassDOT will coordinate with the RTAs to continue piloting fare-affordability transit programs as recommended by the FY23 RTA Fare Free Pilot Program final report. Future analyses or considerations for transitioning to fare-free transit should examine the opportunity for longer pilot durations and additional analysis on equity impacts, maximum load or existing capacity of revenue vehicles, and the cost to collect fares, including recurring costs to upgrade fare collection technology.	Policy and Program Partnerships	**RTD** **MBTA** Legislative Affairs	Ongoing	Mid term	TEAI1.1; 3.2

Action Items	Category	Division(s)	Status	Timeframe	Related
TEAI1.3 Capital enhancements for transit station access improvements. MassDOT will support the MBTA and the state's RTAs to identify bus stops and other transit system access points and elements in need of capital enhancement, including increasing the comfort and safety of these access points and customer amenities offered at them. Since municipalities and private companies often own bus stop infrastructure, these entities will be engaged as appropriate.	Partnerships Capital Planning	**MBTA** **RTD**	New	Mid term	SAI4.4 DCAI2.1; 2.2; 3.1 TEAI3.1
TEAI1.4 Enhance coordination of services involved in human services transportation (HST). Develop more robust collaboration efforts between all agencies involved in providing human services transportation, including seniors, paratransit, and non-emergency medical and social service needs. MassDOT's Rail and Transit Division will look to further develop its partnership and collaboration with other agencies that support these services, particularly the Executive Office of Health and Human Services' Human Service Transportation Office, the Department of Developmental Services, the Massachusetts Rehabilitation Commission, the Massachusetts Commission for the Blind, the Department of Mental Health, Councils on Aging, the MBTA, RTAs, and other identified agencies and their relevant departments and offices	Partnerships Policy and Program	**RTD** MBTA	New	Short term	

Travel Experience Problem Statement 2

Missing sidewalks, curb ramps, and crosswalks limit mobility options, especially for older adults, people with disabilities, and children. This is a particular issue in rural communities, where many such residents live.

Table 5.18 Travel Experience Action Items—Problem Statement 2

Action Items	Category	Division(s)	Status	Timeframe	Related
TEAI2.1 Data layers. MassDOT will make special efforts to build out high-quality, frequently updated data layers regarding pedestrian and bicycle infrastructure to ensure that our agency and partners are equipped with the most up-to-date information regarding conditions along these network elements. This includes investing in LiDAR and exploring best practices for collecting and maintaining this data, especially in low-density areas.	Research	**OTP** **OPMI**	New	Mid term	TEAI2.2; 3.4; 4.2

Action Items	Category	Division(s)	Status	Timeframe	Related
TEAI2.2 Funding and technical assistance. MassDOT will use updated data and resources, including those reflecting bicycle and pedestrian infrastructure, to pursue Federal and state funding for discretionary grant-making purposes to cities and towns and provide enhanced technical assistance for Complete Streets and Safe Routes to School projects.	Policy and Program Research	**OTP** Highway	New	Mid term	SAI1.2 SCTAI1.1 TEAI2.1; 3.4
TEA2.3 Issue briefs for traditionally underrepresented communities. MassDOT will develop issue briefs that more fully document unique transportation challenges and concerns of traditionally underrepresented demographic groups. These groups include but are not limited to people with disabilities; residents of rural communities; people of color; older adults; the LGBTQIA+ community; Asset Limited, Income Constrained, Employed (ALICE) people; the immigrant community; women; indigenous people; and youth. These Massachusetts-specific issue briefs will provide an in-depth summary of these communities' unique transportation needs and document action items and best practices for addressing them.	Research	**OTP**	New	Short term	

Travel Experience Problem Statement 3

Transit riders, people with disabilities, and limited English proficient (LEP) community members find it challenging to understand and navigate transit infrastructure, including stations, service changes involving diversions, and alternative routing options.

Table 5.19 Travel Experience Action Items—Problem Statement 3

Action Items	Category	Division(s)	Status	Timeframe	Related
TEAI3.1 Station and vehicle improvements. The MBTA and RTAs will continue to invest in station and vehicle improvements that increase accessibility for people with disabilities including installing new elevators in stations, enabling the real-time broadcast of information audibly and visually, purchasing new buses, and launching initiatives that provide riders with accessibility resources. Those stations, stops, and vehicles that are currently inaccessible will be prioritized.	Capital Planning	**MBTA** **RTD**	Ongoing	Mid term	SAI4.4 TEAI1.3
TEAI3.2 Signage and customer information. In addition to the standard capital program process, MassDOT will look for new opportunities to offer funding to RTAs to expand signage and real-time customer information-sharing systems, with a particular focus on translating materials into languages other than English.	Policy and Program	**RTD**	New	Mid term	TEAI3.4; 4.1

Action Items	Category	Division(s)	Status	Timeframe	Related
TEAI3.3 Inventory of wayfinding gaps. MassDOT, in coordination with regional planning partners and municipalities, the MBTA, and the RTAs, will develop an inventory of bus stops and transit stations that lack sufficient wayfinding signage and the translation of information into appropriate languages. This inventory will be accompanied by an analysis of bus stop and transit station usage by different demographic groups to better understand the needs of these communities. This inventory will inform a capital funding program targeting improved wayfinding for critical locations and populations.	Policy and Program	**OTP** ODCR MBTA RTD	New	Short term	TEAI2.1; 2.2; 3.3; 4.1
TEAI3.4 Regional Mobility Manager network. MassDOT will continue to explore the development of a network of Regional Mobility Managers across the state, consistent with the Regional Mobility Management study. Regional Mobility Managers assist older adults, people with disabilities, low-income individuals, and others who lack access to transportation in learning about and learning to use existing transportation options—and assisting organizations in partnering to fill gaps in the transportation network.	Policy and Program	**RTD** OTP	New	Mid term	DCAI1.3 TEAI3.6
TEAI3.5 Ride Match. Ride Match is an online, searchable database of public and private transportation options. MassDOT will develop processes and protocols to ensure that the data is regularly updated and a fully functional resource for people to learn about transit options available through all sources including transit authorities, Councils on Aging, local nonprofits, and private operators.	Policy and Program	**RTD** OTP	New	Mid term	DCAI1.3 TEAI3.6

Travel Experience Problem Statement 4

Bicyclists report that wayfinding and amenities at facilities are confusing or substandard.

Table 5.20 Travel Experience Action Items—Problem Statement 4

Action Items	Category	Division(s)	Status	Timeframe	Related
TEAI4.1 Guidance on wayfinding and signage. MassDOT will provide technical assistance to municipalities and partner agencies for bicycle routes and wayfinding signage.	Policy and Program Partnerships	**OTP** Highway	New	Mid term	TEAI3.3; 3.4
TEAI4.2 Inventory of active transportation amenities. MassDOT will conduct a full inventory of amenities like bicycle repair stations, benches, restroom facilities and shelters, water fountains, and bicycle parking available at key points along rail trails and major bicycle and pedestrian corridors.	Research	**OTP**	New	Short term	SAI3.1; 3.2 SCTAI1.1 DCAI2.2 TEAI2.1

Travel Experience Problem Statement 5

The systems and protocols that support excellent customer service are not always prioritized.

Table 5.21 Travel Experience Action Items—Problem Statement 5

Action Items	Category	Division(s)	Status	Timeframe	Related
TEAI5.1 Customer surveys. MassDOT and the RTAs will continue to expand customer survey efforts to better understand overall customer satisfaction issues and to log customer complaints.	Policy and Program	**OPMI** RTD	New	Short term	N/A
TEAI5.2 RMV Customer service improvements. MassDOT's RMV will improve and modernize facilities and online services to improve operational efficiency, effectiveness and customer service. Specifically, this effort will involve the continued digitization of RMV service to reduce VMT to RMV service centers as well as the advancement of credentialing with multiple privileges (e.g., consolidating state processes to expand the use of driver's licenses for multiple purposes, including accessing public transportation, demonstrating professional credentials, and eligibility for state-funded programs administered by other agencies).	Operational Improvements	**RMV**	Ongoing	Short term	N/A
TEAI5.3 Improvements to MassDOT Highway Service Centers and Rest Areas. MassDOT's Highway Division will identify and implement improvements for highway service centers and rest areas under its jurisdiction.	Operational Improvements	**Highway**	New	Short term	N/A

6.0 Performance-Based Planning

This chapter describes a number of performance measures that could be implemented to track the impacts of the *Beyond Mobility* Action Items on overall performance of the transportation system in Massachusetts. Performance-based planning is a strategic approach that uses data to support decisions to help achieve desired performance outcomes. Given *Beyond Mobility's* focus on equity and centering people as part of the transportation planning process, data analyzed as part of this chapter address multiple modes of travel and the experience of all communities in the Commonwealth through an equity lens. Using these data, MassDOT has identified three categories of metrics that illustrate performance:

- Measures that can be analyzed and reported longitudinally (in multiple years across time) within the *Beyond Mobility* report and Appendix D (*System Performance Report*).
- Measures that are important to track and could be analyzed and reported in the near future. These measures may require some additional analysis or maturation of data in order to produce analyses over time and targets for the future.
- Measures that may be desirable to track but that require additional effort to collect data in order to build MassDOT's understanding to a point where data can be reported and targets can be set.

Across all categories, MassDOT has identified a subset of measures to further define in the future and for potential inclusion in future editions of MassDOT's annual performance report *Tracker*. These are summarized in Table 6.1.

Table 6.1 Measures Recommended for Inclusion in *Tracker*

Priority Area	Measure
Safety	Number of pedestrian crashes per population in REJ+ and non-REJ+ communities
	Pedestrian crash cluster area per population in REJ+ and non-REJ+ communities
	Number of non-motorist serious injuries and fatalities per population in REJ+ and non-REJ+ communities
	Number of vehicular fatal and serious injury crashes per population in REJ+ and non-REJ+ communities
	Percent difference in roadway risk miles between REJ+ and non-REJ+ communities
	Number of fatalities on principal or minor arterials
	Miles of sidewalk gaps in areas with older adults and people with disabilities
	Miles of sidewalk gaps within one-half mile of transit
Destination Connectivity	Difference in travel times between white and non-white commuters
	Percent of potential for bicycling (high) miles of total road miles
	Average number of critical destinations (hospitals, food retailers, higher education institutions, jobs, and parks) available to people living in block groups

Priority Area	Measure
	with high % of non-white households vs. all else within 30 minutes of travel time by transit
	Average number of critical destinations (hospitals, food retailers, higher education institutions, jobs, and parks) available to people living in block groups with high % of non-white households vs all else within 30 minutes of travel time by car
	Percent of residents who drive alone to work
	Number of existing and planned bike facilities per capital in REJ+ and non REJ+ communities
	MassDOT-owned roads with sidewalks
	Percent of sidewalk gaps on roadway miles near rural transit stops
	Difference in average commute time between driving and public transportation
Travel Experience	Difference of deficient curb ramps between REJ+ and non-REJ+ communities
	Difference of sidewalk gaps as a percentage of total roadway miles between rural and urban communities
	Difference of percent of poor/fair road condition per capita between rural and urban communities
	Difference of poor/deficient bridges per capita between rural and urban communities
	Difference of deficient curb ramps between rural and urban communities
	Percentage of MBTA and RTA riders that are low income
Reliability	Corrective measures implemented (or dollars invested) at truck bottlenecks
Supporting Clean Transportation	Ozone precursor pollutants (e.g., particulate matter, nitrogen oxides, volatile organic compounds, etc.) and other emissions from transportation sources broken down by EJ vs. non-EJ communities
	Percent of absolute statewide GHG emissions attributed to transportation sources (in line with the statewide goal achieve Net Zero by 2050).
	GHG avoided through electric charging station sessions
	Fuel-use avoided through electric charging station use
	Number of miles of shared paths, separated bike lanes, and bicycle-friendly streets
	Number of bicycle miles traveled
	Non-single-occupant-vehicle mode share
	Percent of rental housing units in transit overlay zoning districts, year-over-year
	Housing units per acre near transit stops
	Share of vehicles registered in Massachusetts that are EV or hybrid
	Average miles per day driven by EV vs. fossil fuel vehicles
	Number of electric charging station sessions (overall and broken down by REJ+ vs. non REJ+ communities and by rural vs. non-rural communities).

6.1 System Performance Report

The performance measures contained in this chapter were developed directly in response to *Beyond Mobility* data analysis as part of the Plan's Needs Assessment task as well as public engagement feedback, and are organized by *Beyond Mobility's* six Priority Areas. In addition to these plan-specific performance measures, MassDOT is required by Federal regulation to submit a *System Performance Report* to FHWA as a companion to *Beyond Mobility*. The measures in the *System Performance Report* fall under four classes established by USDOT's regulations in 2016, 2017, and 2023 establishing National Performance Management (NPM) measures in the following areas: Safety, Infrastructure Condition, System Performance, and Greenhouse Gas Emissions. This information on federally-required measures and targets in line with national goals is available in Appendix D. Outside of the *System Performance Report*, these measures are reported regularly to the Federal government within five-year "periods of performance." The current period is 2022–2026.

6.2 Safety

MassDOT has identified several measures to evaluate progress toward addressing the *Beyond Mobility* vision for safety. Given the disparity in transportation safety outcomes between Environmental Justice communities (referred to here as REJ+ communities based on the use of the REJ+ data described in Chapter 2), equity is at the center of the measures proposed to evaluate transportation safety in Massachusetts. In addition to the data described in this chapter, more information on overall trends on crashes and a variety of other safety analyses can be found in MassDOT's 2023 *Strategic Highway Safety Plan* (SHSP) and *Vulnerable Road User Safety Assessment*.

Measuring Over Time: Number of Pedestrian Crashes per Population in REJ+ and non-REJ+ Communities

A key Problem Statement included as part of the safety section of *Beyond Mobility* is that **people of color, older adults, and low-income populations are disproportionately burdened by transportation-related injuries and deaths, particularly those involving pedestrians and people on bicycles.** In order to contextualize progress toward addressing this problem, MassDOT has conducted a longitudinal analysis of the number of pedestrian crashes per population in REJ+ and non-REJ+ communities using data from MassDOT's IMPACT portal for the years 2018 through 2022. This analysis was done by assigning pedestrian crashes to either REJ+ or non-REJ+ block groups based on their location and then compared pedestrian crashes per 100,000 population.[92]

Table 6.2 and Figure 6.1 presents the disparity between REJ+ and non-REJ+ communities as it relates to pedestrian crashes per population. Pedestrian crashes per population decreased in both REJ+ and non-REJ+ communities from 2018 to 2020, and then began to rise in 2021 and 2022.

These data analyzed in this section show a clear disparity in non-vehicular crashes, as well as crash severity, between REJ+ and non-REJ+ communities. As such, through its ongoing initiatives and

[92] Per 100,000 population is used to produce a more readable decimal (as compared to per million population), unless otherwise noted.

additional Action Items described in Chapter 5, MassDOT will take several steps intended to reduce this disparity as well as the overall magnitude of crashes decreasing over time. Chapter 4 of *Beyond Mobility* contains additional key facts on this topic as well as maps overlaying REJ+ data with crash data to visualize where disparities exist.

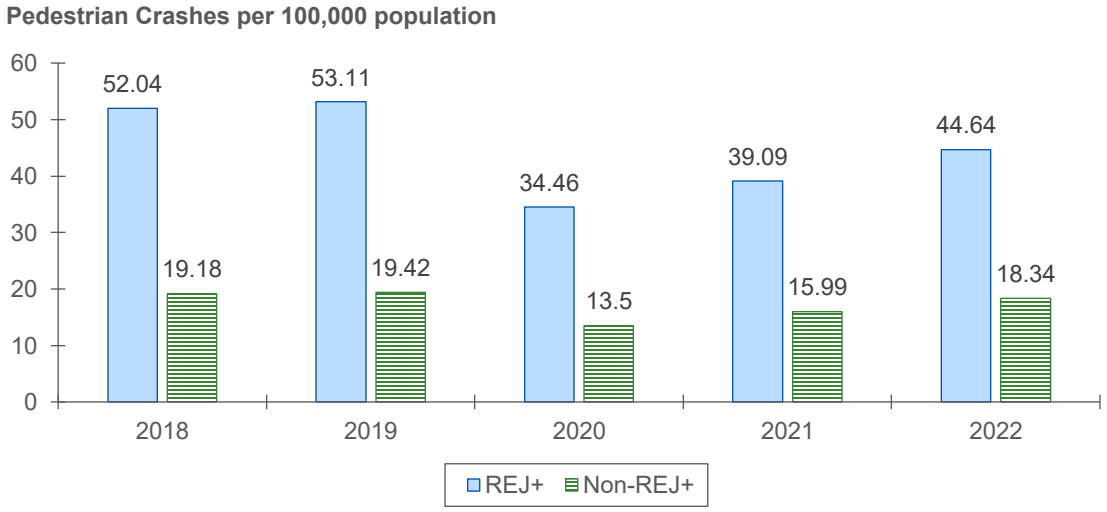
Table 6.2 Pedestrian Crashes per 100,000 Population in REJ+ and non-REJ+ Communities, 2018–2022

Year	REJ+	Non-REJ+	Difference[1]	% Difference[2]
2018	52.0	19.2	32.9	63%
2019	53.1	19.4	33.7	63%
2020	34.5	13.5	21.0	61%
2021	39.1	16.0	23.1	59%
2022	44.6	18.3	26.3	59%

[1] *Difference of REJ+ and non-REJ++.*

[2] *Percent difference of REJ+ and non-REJ+ pedestrian crashes per population.*

Figure 6.1 Pedestrian Crashes per 100,000 Population in REJ+ and non-REJ+ Communities, 2018–2022



Additional longitudinal safety analyses comparing REJ+ communities and non-REJ+ communities (including pedestrian crash cluster areas, non-motorist serious injuries and fatalities, vehicular fatal and serious injury crashes, percent difference in roadway risk miles, and fatalities on principal or minor arterials) are available in Appendix D (System Performance Report).

Measures To Analyze Using Most Recent Available Data

An additional key safety problem statement in *Beyond Mobility* is that **people walking, bicycling, and rolling experience an unsafe and low-comfort system.** To address this problem, MassDOT will explore developing the following performance measures for incorporation into its Performance Management Report, *Tracker*:

- **Miles of sidewalk gaps in areas with older adults and people with disabilities.** MassDOT has a goal of eliminating sidewalk gaps across the Commonwealth as a means of promoting active transportation and reducing reliance on cars for travel. This process should also be equitable across communities. Data to support these measures can be drawn from the MassDOT *Road Inventory File* and the *Next Generation Bicycle and Pedestrian Vision Mapping Initiative*.

- **Miles of sidewalk gaps within one-half mile of transit.** MassDOT has a goal of eliminating sidewalk gaps in close proximity to public transit across the Commonwealth as public feedback and other analyses have shown it is critically important that Massachusetts residents can access transit on-foot. This process should also be equitable across communities. Data to support these measures can be drawn from the MassDOT Road Inventory File. The length of sidewalk gaps within one-half mile of transit should decrease over time.

Measures We Will Develop Further

Beyond Mobility has also identified measures that are desirable to monitor in the area of Safety. These are presented in Table 6.3.

Table 6.3 Safety Measures Identified for Future Development

Problem Statement	Measures for Future Development	Desirable Direction
Safety Measures Proposed for Tracker		
People walking, bicycling, and rolling experience an unsafe and low-comfort system.	Number of pedestrian crashes per population in REJ+ and non-REJ+ communities	Decrease
	Pedestrian crash cluster area per population in REJ+ and non-REJ+ communities	Decrease
	Number of non-motorist serious injuries and fatalities per population in REJ+ and non-REJ+ communities	Decrease
	Number of vehicular fatal and serious injury crashes per population in REJ+ and non-REJ+ communities	Decrease
	Percent difference in roadway risk miles between REJ+ and non-REJ+ communities	Decrease
	Number of fatalities on principal or minor arterials	Decrease

Problem Statement	Measures for Future Development	Desirable Direction
	Miles of sidewalk gaps in areas with older adults and people with disabilities	Decrease
	Miles of sidewalk gaps within one-half mile of transit	Decrease
Safety Metrics for Future Development		
People of color, older adults, and low-income populations are disproportionately burdened by transportation-related injuries and deaths, particularly those involving pedestrians and people on bicycles.	Difference in non-fatal pedestrian injury rates (hospital stays/100,000 residents) by racial identification	Decrease
Massachusetts traffic fatalities and fatality rates rose between 2019 and 2022, but have since begun trending downward.	Noted crash characteristics of the number of fatalities[1]	Decrease
	Noted crash characteristics of serious injuries[2]	Decrease
People walking, bicycling, and rolling experience an unsafe and low-comfort system.	Number of unprotected at-grade rail crossings	Decrease
	Number of safety incidents at at-grade rail crossings	Decrease
Residents perceive an unsafe environment on public transportation.	Number of safety events resulting from deferred maintenance	Decrease
There is a need for additional safety-related research and education in a number of other areas, including emerging technologies, drivers' education, and implications of the lack of cellular service in rural areas.	Average emergency response time to vehicular crashes by community, census tract, or ZIP code.	Decrease

[1] *The overall number of fatalities is a performance measure tracked in the System Performance Report as discussed in Section 1.1. MassDOT is recommending that it track additional characteristics of crashes that cause fatalities in the future.*

[2] *The overall number of serious injuries is a performance measure tracked in the System Performance Report as discussed in Section 1.1. MassDOT is recommending that it track additional characteristics of crashes that cause serious injuries in the future.*

6.3 Reliability

The *Beyond Mobility* vision for the Reliability Priority Area centers on increased predictability of travel times across all modes. As such, the data proposed to measure performance in this area described below is intended to address all modes of travel. Since MassDOT's Performance Management Report, *Tracker*, already tracks data such as on time performance for transit and other key reliability metrics, the measures proposed in this section are described to build on existing efforts.

Measures To Analyze Using Most Recent Available Data

MassDOT has documented as a problem statement that **supply chains are disrupted when freight travel is unreliable.** To track progress toward addressing this problem, MassDOT will develop the following performance measure:

- **Corrective measures implemented (or dollars invested) at truck bottlenecks.** In 2022, MassDOT completed a study of truck bottlenecks that identified low, medium, and high effort options to improve performance at these locations. MassDOT's *2023 Freight Plan Update* also includes a list of updated bottlenecks. MassDOT's investments in these options can be tracked through the annual *Capital Investment Plan* (CIP), with the goal of increasing corrective measures to address truck bottlenecks.

Measures We Will Develop Further

Beyond Mobility has also identified measures that are desirable to monitor in the area of Reliability. These are presented in Table 6.4.

Table 6.4 Reliability Measures Identified for Future Development

Problem Statement	Measures for Future Development	Desirable Direction
Massachusetts travelers by any mode are highly vulnerable to reliability issues, resulting in lower access to everyday needs.	Percent of active transportation infrastructure included in snow removal procedures	Increase
	Travel time reliability in Greater Boston	Increase
	Travel time reliability and day-of-week variation	Increase
MassDOT's roadway and transit networks do not optimize travel during off-peak periods and must adapt to changing congestion patterns.	Duration of peak periods on key corridors	Contextual measure, neither direction is more desirable
Roadway congestion diminishes transit reliability, limiting the competitiveness of sustainable transportation options.	Percent of scheduled fixed route bus trips operated (by transit provider)	Increase
	Number of blocked bus-lane incidents	Decrease
	Number of bus-lane citations issued	Increase until violations decrease
Supply chains are disrupted when freight travel is unreliable.	Occupancy rate for truck parking areas	Increase
	Crashes caused by shoulder-parked trucks	Decrease

6.4 Supporting Clean Transportation

Consistent with other statewide efforts such as the *Massachustts Clean Energy and Climate Plan for 2025 and 2030* and the Massachusetts Climate Chief's report*, ResilientMass*, the *Beyond Mobility* vision for Supporting Clean Transportation, centers equity in the process of advancing Massachusetts' climate goals. Additionally, the *Supporting Clean Transportation* vision and values

statements acknowledge that the achievement of these climate goals is a multifaceted process that must involve efforts in the areas of electrification, mode shift, improved coordination between housing and transportation, and land use and zoning reform, among others. As such, the performance measures proposed in this section represent a variety of perspectives.

Measures To Analyze Using Most Recent Available Data

MassDOT has documented as a key problem statement that **availability of suitable infrastructure is a potential barrier to low-emission transportation choices.** To address this problem, and consistent with the Massachusetts Climate Chief's Report released in October 2023, MassDOT will explore the development of the following performance measure for inclusion in its annual Performance Management Report, *Tracker*:

- **Number of electric vehicle charging stations (overall and broken down by REJ+ vs. non REJ+ communities and by rural vs. non-rural communities).** In 2022, MassDOT completed the *National Electric Vehicle Infrastructure (NEVI) Plan,* funded by and following the NEVI Program included in BIL. NEVI and the Charging and Fueling Infrastructure (CFI) grant program are sources of Federal funding for MassDOT and other public agencies in Massachusetts to build charging infrastructure. Municipalities and the private sector are also pursuing the installation of charging stations on a variety of sites. The *NEVI Plan* identifies current infrastructure and prioritizes locations for future infrastructure, and MassDOT is tracking progress toward its goals and objectives. MassDOT has a goal of increasing charging stations over time. Additionally, in line with the Massachusetts Climate Chief's Report, MassDOT is committed to tracking equity in this area, "such that Environmental Justice (EJ) communities are served by NEVI-funded direct current fast chargers (DCFCs) at a rate equal to or greater than non-EJ communities."[93]

Measures We Will Develop Further

Beyond Mobility has also identified measures that are desirable to monitor in the area of Clean Transportation. These are presented in Table 6.5.

Table 6.5 Supporting Clean Transportation Measures Identified for Future Development

Problem Statement	Measures for Future Development	Desirable Direction
Supporting Clean Transportation Measures Proposed for *Tracker*		
Transportation is the largest contributor of Massachusetts' carbon emissions and transportation-related emissions are disproportionately concentrated in historically marginalized communities.	Share of vehicles registered in MA that are electric	Increase
	Share of transit vehicles that are electric, broken down by each RTA and the MBTA and by transit mode	Increase
	Number of combustion vehicles registered in Massachusetts	Decrease
	Average miles per day driven by EV vs. fossil fuel vehicles	Increase

[93] Hoffer, Melissa. "Recommendations of the Climate Chief." Page 45.

Problem Statement	Measures for Future Development	Desirable Direction
	Ozone precursor pollutants (e.g., particulate matter, nitrogen oxides, volatile organic compounds, etc.) and other emissions from transportation sources broken down by EJ vs. non-EJ communities	Decrease
	Percent of absolute statewide GHG emissions attributed to transportation sources (in line with the statewide goal to achieve Net Zero by 2050).	At least 34% below the 1990 baseline level by 2030
	GHG avoided through electric charging station sessions	Increase
	Fuel-use avoided through electric charging station use	Increase
Availability of suitable infrastructure is a potential barrier to low-emission transportation choices.	Number of miles of shared paths, separated bike lanes, and bicycle-friendly streets	Increase
	Number of bicycle miles traveled	Increase
	Non-single-occupant-vehicle mode share	Increase
Existing land use patterns reinforce car travel and exclude lower-income people from living multimodal lives.	Percent of rental housing units in transit overlay zoning districts, year-over-year	Increase
	Housing units per acre near transit stops	Increase

6.5 Destination Connectivity

To measure progress toward achieving the *Beyond Mobility* Destination Connectivity vision, a variety of data summarizing issues like access to destinations, commute times, modal choice, presence of bicycle and pedestrian facilities, and others were analyzed and are reported in this section with a focus on social and geographic equity.

Measuring Over Time: Difference in Average Commute Time for Driving and Public Transportation

To better understand differences in travel times across modes, a longitudinal analysis of the difference in average commute time for driving and public transit using Census data for 2017–2021 was performed for each of the three urbanized areas (UZAs) within Massachusetts (Boston–Cambridge–Newton, Worcester, and Springfield) as well as statewide. These results were developed by compiling 5-Year American Community Survey (ACS) commute time by means of transportation data, and then calculating the mean travel time for each method of transportation. The mean was calculated for each range of the data (assuming 60+ minutes is 60–120 minutes), and then combined to determine the total mean time per transportation method.

Table 6.6 presents the difference in travel time between driving and taking public transit for the UZAs and statewide regions. Figure 6.2 and Figure 6.3 also illustrate these data. MassDOT has a goal of decreasing this percentage over time. The table also indicates that residents in the Worcester and Boston urban areas have a much higher commuting time for public transit riders compared to people

who drive in the same region. This could indicate that there are less direct options when considering origin-destination pairs compared to Springfield urban area residents.

Through its ongoing initiatives and projects, as well as additional Action Items described in Chapter 5, MassDOT aims to address the disparities in travel time across modes presented here to make transit travel times more competitive with driving.

Table 6.6 Comparison of Commute Time between Driving and Public Transit (minutes) by Urbanized Area, 2017–2021

	Boston		Springfield		Worcester		Statewide	
Year	Driving	Public Transit	Driving	Public Transit	Driving	Public Transit	Driving	Public Transit
2017	33	54	25	37	32	63	31	55
2018	34	55	25	38	32	64	32	55
2019	34	56	26	37	33	64	32	56
2020	34	55	26	37	33	66	32	56
2021	33	56	26	36	33	67	32	56

Notes: Commuting time listed in minutes; analysis based on the population of working age residents (aged 15-64), not total population.

Figure 6.2 Difference in Statewide Commute Time between Driving and Public Transit, 2017–2021

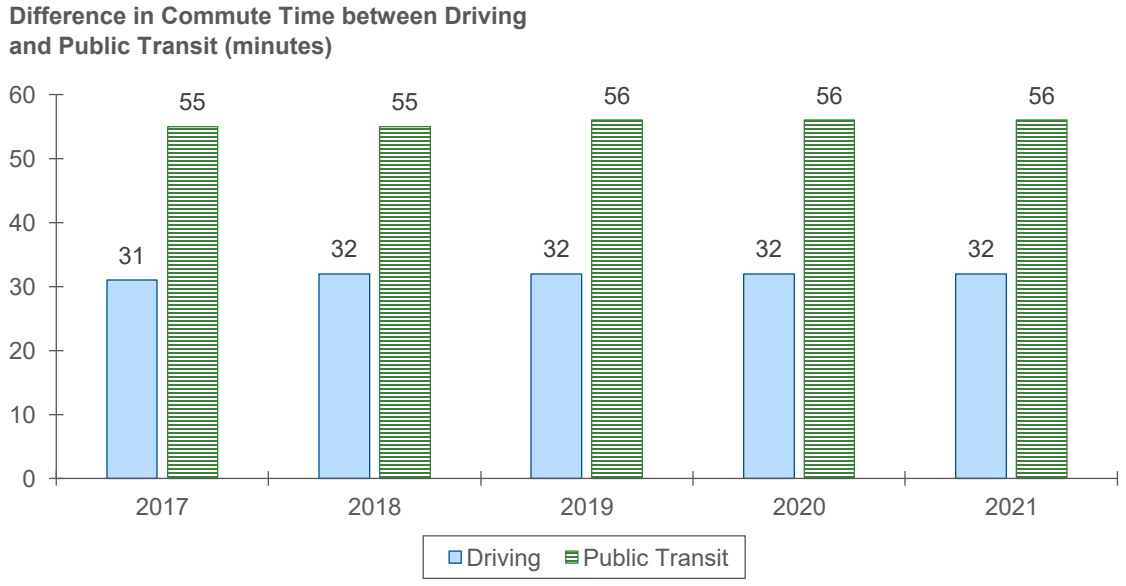
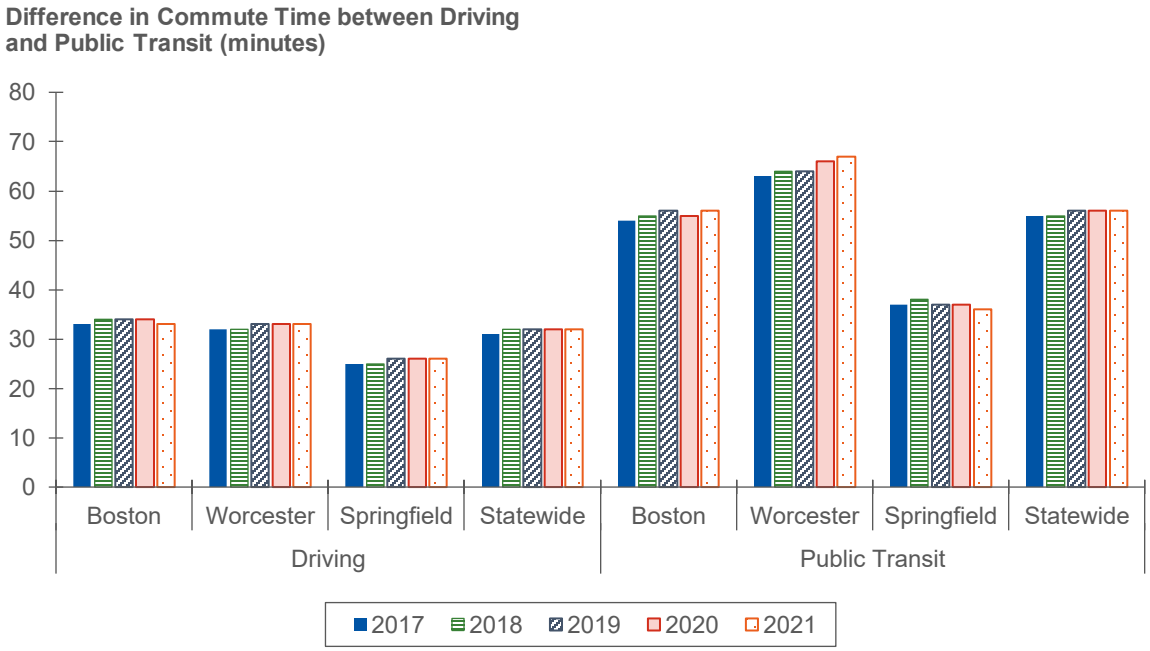


Figure 6.3 Comparison of Statewide Commute Time between Driving and Public Transit by Urbanized Area, 2017–2021



Measures To Analyze Using Most Recent Available Data

Another key Problem Statement is that **people living in historically marginalized communities are burdened by connectivity inequities.** Additionally, despite having more areas with high potential for bicycling, REJ+ communities have fewer existing and planned bike facilities per population than all other communities. To address these problems, MassDOT will explore developing the following performance measures as part of its Performance Management Report, *Tracker*:

- **Number of existing and planned bike facilities per population in REJ+ and non-REJ+ communities.** MassDOT has a goal of increasing the number of existing and planned bicycle facilities across the Commonwealth as a means of promoting active transportation and reducing reliance on cars for travel. This process should also be equitable across communities. Data to support these measures can be drawn from the MassDOT *Road Inventory File*.
- **Percent for potential for bicycling (high) miles of total road miles in REJ+ and non-REJ+ communities.** MassDOT has a goal of increasing the miles of high potential for bicycling across the Commonwealth as a means of promoting active transportation and reducing reliance on cars for travel. This process should also be equitable across communities. Data to support these measures can be drawn from the MassDOT *Road Inventory File* and *Potential for Everyday Biking Maps*.

MassDOT has also documented the **lack of continuous, safe, high-comfort bike or pedestrian pathways connecting existing bicycle facilities limits the ability of people bicycling to access key destinations** as a Problem Statement. To address this problem, MassDOT will develop the following performance measure:

- **MassDOT-owned roads with sidewalks.** MassDOT has a goal of increasing the miles of sidewalk on MassDOT roadways across the Commonwealth as a means of promoting active transportation and reducing reliance on cars for travel. This process should also be equitable across communities. Data to support these measures can be drawn from the MassDOT Road Inventory File.

Measures We Will Develop Further

Beyond Mobility has also identified measures that are desirable to monitor in the area of Destination Connectivity. These are presented in Table 6.7.

Table 6.7 Destination Connectivity Measures Identified for Future Development

Problem Statement	Measures for Future Development	Desirable Direction
Destination Connectivity Measures Proposed for Tracker		
Though reduced car travel is a desired and crucial step toward decarbonization, Massachusetts community members find it difficult to get around using other modes including transit	Percent of residents who drive alone to work	Decrease
	Difference in average commute time for driving and public transportation	Decrease
People living in historically marginalized communities are burdened by connectivity inequities across our transportation systems, limiting their access to opportunities.	Difference in travel times between white and non-white commuters	Decrease
	Average number of critical destinations (hospitals, food retailers, higher education institutions, jobs, and parks) available to people living in block groups with high % of non-white households vs all else within 30 minutes of travel time by car	Increase
	Average number of critical destinations (hospitals, food retailers, higher education institutions, jobs, and parks) available to people living in block groups with high % of non-white households vs all else within 30 minutes of travel time by transit	Increase
Destination Connectivity Metrics for Future Development		
Rural residents especially lack convenient transit services and other non-vehicular transportation options, and feel disconnected from cultural, economic, and other opportunities.	Percent of sidewalk gaps on roadway miles near rural transit stops	Decrease
	Average reservation lead time for rural transit services	Decrease
Though reduced car travel is a desired and crucial step toward decarbonization, Massachusetts community members find it difficult to get around using other modes including transit.	Bicycle mode share	Increase
	Commuter Rail frequency	Increase

Problem Statement	Measures for Future Development	Desirable Direction
The lack of contiguous, safe, high-comfort bike or pedestrian pathways connecting existing bicycle facilities limits the ability of people bicycling to access key destinations.	Percentage of MassDOT pedestrian facilities that are covered by regular snow and ice operations	Increase
	Percentage of MassDOT bike facilities that are a part of regular snow and ice operations	Increase
	Percentage of MassDOT-owned centerline miles of roadway with bicycle lanes	Increase

6.6 Resiliency

MassDOT has undertaken several analyses of asset vulnerability over the past decade, such as the Massachusetts Coast Flood Risk Model (MC-FRM) to document the extent of flooding produced for 2030, 2050, and 2070, as well as the *Statewide Drainage Study* on the Deerfield River watershed to both identify stream crossings using GIS analysis and then analyze their vulnerability to riverine flooding under current and projected future conditions. At a systemwide level, MassDOT applied in August 2023 for a PROTECT discretionary grant to conduct a Statewide Flood Risk Assessment. One of the elements of this assessment is to "prioritize assets, identify resilience strategies, and improve planning processes."

MassDOT and the MBTA also participated in the SHMCAP (also known as *ResilientMass*). Both MassDOT and the MBTA submitted actions as part of this effort.

Measures We Will Develop Further

Beyond Mobility has identified measures that are desirable to monitor in the area of Resiliency. These are presented in Table 6.8. In addition to these measures, the general state of good repair of MassDOT's transportation assets is considered relevant to resiliency as a focus area. These measures are addressed in the *System Performance Report* (Appendix D) provided as a companion to *Beyond Mobility*.

Table 6.8 Resiliency Measures Identified for Future Development

Problem Statement	Measures for Future Development	Desirable Direction
Resiliency Measures for Future Development		
Significant transportation infrastructure in Massachusetts is potentially exposed to natural hazards.	Number of CIP projects that address locations found (through a statewide flood risk assessment) to be vulnerable or at high risk for flooding and other natural hazards	Increase
	Amount of Federal relief funding Massachusetts has received as a result of natural hazards or declared disaster events	N/A

6.7 Travel Experience

The *Beyond Mobility* vision for the Travel Experience Priority Area encompasses affordability of transit, state of good repair, wayfinding, and other important elements addressing the ease of

navigating the transportation system. Data addressing these items and proposed to evaluate the quality of travel experience in Massachusetts are documented in this section.

Measuring Over Time: Percentage of MBTA Riders who are Low Income

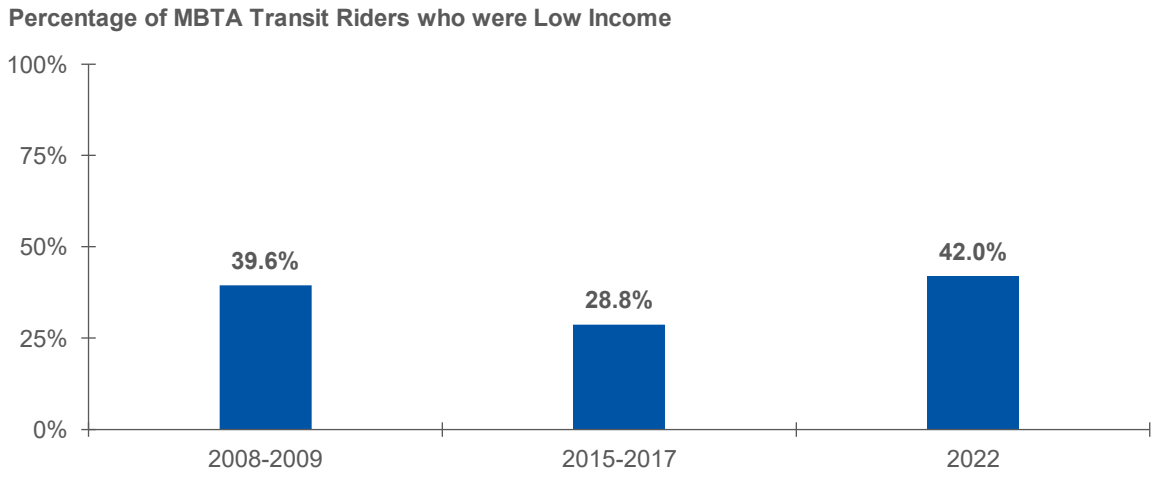
MassDOT has documented as a key problem statement that **Environmental Justice communities are in need of an enhanced user experience and increased affordability on transit.** In order to contextualize progress toward this goal, MassDOT has conducted a longitudinal analysis of the percentage of MBTA riders who are low income using MBTA systemwide passenger surveys from the years 2008–2009, 2015–2017, and 2022. It is critically important to collect, analyze, and report usage of transit by low-income riders in order to better understand the performance of the system.

The definition of "low income" has varied among surveys over the past 15 years. The most recent survey defines riders who are low income earn as a household less than 60 percent of the annual median income for the MBTA service area, defined using the most recent available American Community Survey (ACS) from the US Census Bureau. The 2021 ACS placed this figure at just over $60,000 per year. MBTA passenger surveys have also used a Federal definition of low income as 150 percent of the Federal poverty line. This definition varies with household size, but in 2023 a family of four would be classified as low income if their annual household earnings were less than $45,000.

With a consideration for the effect of inflation and the varying definitions across time, Figure 6.4 presents the percentage of MBTA riders who were low income in 2008–2009, 2015–2017, and 2022, and indicates that about two out of every five MBTA riders are low income.

A number of *Beyond Mobility* Action Items presented in Chapter 5 seek to address the need for increased affordability of transit, particularly for low-income riders.

Figure 6.4 Percentage of MBTA Transit Riders who were Low Income across Time



Measures To Analyze Using Most Recent Available Data

MassDOT has documented as a problem statement that **missing sidewalks, curb ramps, and crosswalks limit mobility options for older adults and people with disabilities. This is a particular issue in rural communities which have higher concentrations of these residents.** To address this problem, MassDOT will explore the development of the following performance measures:

- **Difference of deficient curb ramps between REJ+ and non-REJ+ communities; and difference of deficient curb ramps between rural and urban communities.** The Americans with Disabilities Act (ADA) includes geometric and maintenance standards that define curb ramps that are sufficient and deficient. The percentage that are deficient should be equitable across communities. Data to support these measures can be drawn from the *MassDOT Pedestrian Curb Cuts Database*. MassDOT has a goal of decreasing the difference in deficient curb ramps over time.

- **Difference of percent of lane-miles of roadway that are in poor and fair condition between rural and urban communities; and difference of percent of deck area of bridges that are in poor and fair condition between rural and urban communities.** Data to support these measures are collected through regular inspections by the MassDOT Highway Division. The data are reported annually to FHWA at a statewide level, but it is also valuable to ensure that asset condition and investment are equitably distributed across Massachusetts communities. For more detail on how these data are used, reported, and collected, see the *Beyond Mobility Statewide Performance Report* and the *MassDOT Transportation Asset Management Plan*. MassDOT has a goal of decreasing this difference over time.

Measures We Will Develop Further

Beyond Mobility has also identified measures that are desirable to monitor in the area of Travel Experience. These are presented in Table 6.9.

Table 6.9 Travel Experience Measures Identified for Future Development

Problem Statement	Measures for Future Development	Desirable Direction
Missing sidewalks, curb ramps, and crosswalks limit mobility options for older adults and people with disabilities. This is a particular issue in rural communities, which have higher concentrations of these residents.	Failed or missing curb ramps	Decrease
Transit riders, people with disabilities, and LEP community members find it challenging to understand and navigate the transit options available to them.	Percent of transit system accessible through multilingual wayfinding	Increase
	Percent of transit system accessible through universal design	Increase
Bicycle riders report that wayfinding and amenities at facilities are confusing or substandard.	Number of bicycle facilities at transit stops and stations	Increase

The systems and protocols that support excellent customer service are not always prioritized.	RMV customer satisfaction from annual survey	Increase
	Fare collection reliability	Increase

7.0 Funding the Transportation System

7.1 Introduction

This chapter outlines the funding resources expected to be available between now and 2050 to improve transportation in Massachusetts. An important item to note in the context of reporting this information is that *Beyond Mobility* does not constitute a listing of transportation projects and unfunded needs. Rather, this Plan serves as a policy document that establishes a strategic framework and priorities for MassDOT to address largely using existing resources.

The purpose of this *Beyond Mobility* chapter is to describe and estimate the amounts of these existing resources that will be available for transportation capital investment, maintenance, and operations on a regular basis, and to articulate the process by which MassDOT and its partner transportation agencies use this information to address the needs of Massachusetts' transportation system.

MassDOT acknowledges that there are significant challenges when it comes to ensuring sustainable funding streams for the MBTA, RTAs, and the ability to maintain bridges and roads statewide. That said, in line with the idea that the primary focus of *Beyond Mobility* is to serve as a policy document and strategic framework, it is important to note here that additional future work at MassDOT will focus more exclusively on defining specific dollar amounts needed to implement new initiatives resulting from *Beyond Mobility* as they unfold.

7.2 Overview of Transportation Funding in the Commonwealth

Transportation funding for MassDOT's services and responsibilities comes from various sources, including Federal, State, and local dollars. The CIP and the STIP are the most comprehensive budgetary documents that summarize MassDOT's available funding. These documents are developed annually and typically cover a five-year period.

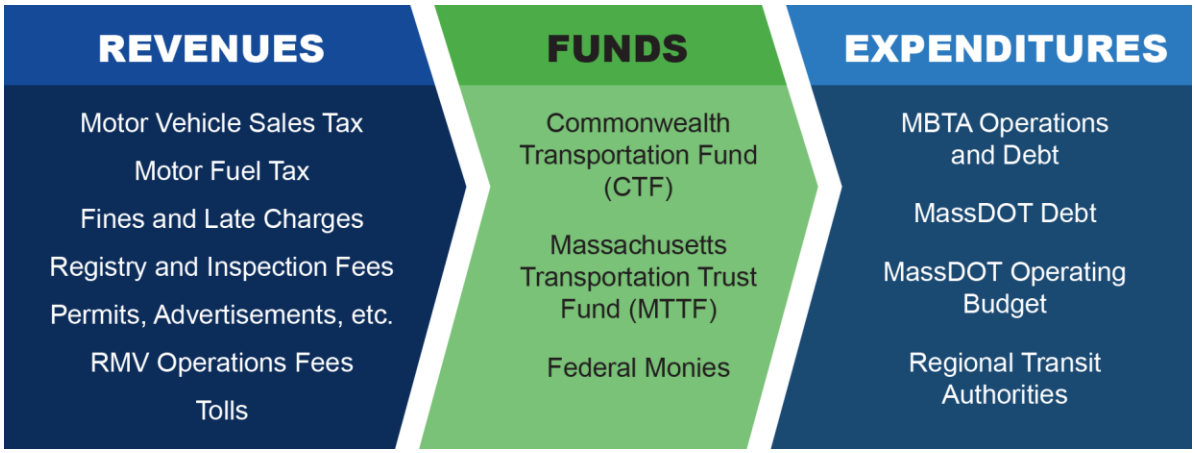
The Problem Statements and corresponding Action Items outlined in *Beyond Mobility* will help to structure the CIP and STIP going forward. Additionally, Action Items in Chapter 5 categorized as "capital planning" efforts will serve as an input as part of this process.

State Sources of Transportation Funding

The Transportation Reform Law of 2009 consolidated many agencies under MassDOT and created funding sources/mechanisms to manage the collection and disbursement of monies for transportation operations, capital projects, and debt servicing. The first fund, called the Commonwealth Transportation Fund (CTF), collects money and fees as per the law. These include fees received by the Registry of Motor Vehicles, motor vehicle fuel and sales taxes, and amounts

appropriated into the fund by the Massachusetts General Court.[94] The second fund, called the Massachusetts Transportation Trust Fund (MTTF), was created in 1991 as part of the Massachusetts Clean Environment Act and collects fares, fees, and toll revenue.[95] Figure 7.1 below shows the revenues collected to support State transportation funds along with the general categories of expenses these funds support.

Figure 7.1 State Transportation Revenues, Funds, and Expenditures



The State issues bonds to provide the statutorily required State match to Federal aid and to support State-funded projects and local transportation grant programs. Bonds, along with toll revenue, make up nearly all State contributions to State transportation capital spending. Bonds are issued either as General Obligation (GO) bonds, which are backed by the general revenues of the Commonwealth, or as Special Obligation bonds, which are backed by dedicated transportation revenues such as the gas tax and vehicle registration fees. These, along with toll revenue, make up nearly all State contributions to State transportation capital spending. Commonwealth GO bond proceeds—referred to as the State bond cap—are allocated to specific projects, primarily for Federal-aid match, project design/development, project management, capital maintenance, and other construction support provided to MassDOT Divisions and the MBTA. Special obligation bond proceeds are allocated to specific projects or initiatives, such as the Rail Enhancement Program, which supports reliability, modernization, and expansion initiatives at the MBTA. Another program supported by special obligation bonds—Massachusetts' Next Generation Bridge Program (NGBP)—focuses on funding bridge preservation and the bundling of smaller MassDOT bridge projects. These projects will be advertised for construction during the five-year 2024–2028 STIP period and are initially funded with non-Federal aid funding (i.e., State funds), and will be repaid in the future with debt repayments using Federal aid. This is reflected in the Highway Funding Program as Grant Anticipation Notes (GANs).

The MBTA also issues debt instruments to fund capital projects, which can include bonds, sustainability bonds, commercial paper, and bond anticipation notes. These funds are used to support projects 100 percent funded by MBTA debt and also provide the local match (typically 20 to 50 percent) for Federally-funded projects.

94 https://malegislature.gov/Laws/GeneralLaws/PartI/TitleIII/Chapter29/Section2ZZZ.
95 https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter6C/Section4.

Another source of state funding for transportation is Chapter 90. Authorized through Massachusetts General Laws (M.G.L) Chapter 90, Section 34, the Chapter 90 Program provides funding to municipalities for the implementation of capital improvements on local public ways. Every municipality in the Commonwealth is allocated a portion of total program dollars. The amount of annual funding a municipality receives is based on local road mileage (58.33%), population (20.83%), and employment (20.83%). Local road mileage is gathered from MassDOT's Road Inventory File. Population data is collected using decennial census data from United States Census Bureau. Employment figures are provided by the Massachusetts Department of Unemployment Assistance. This formula was developed by the Legislative Rural Caucus of the Massachusetts Legislature's Transportation Committee in 1972. In acknowledgement that rural communities are in need of greater funding, Chapter 27 of the Acts of 2023 authorized $25 million in funding to support the construction and reconstruction of municipal ways. Per the legislation, these funds are to be distributed to all 351 municipalities in the Commonwealth using a formula based on local road mileage, municipal population, and rurality. A municipality is considered rural for the purposes of this funding if it has a population of less than 10,000 and a population density under 500 people per square mile.

Additionally, In November 2022, the voters of Massachusetts approved a new 4 percent surtax on income above $1 million annually, known as the Fair Share amendment. This new source is constitutionally dedicated to "quality public education and affordable public colleges and universities, and for the repair and maintenance of roads, bridges, and public transportation." Investments are spread across multiple segments of education and transportation, with a focus on achieving meaningful, equitable impacts for each. In FY 2024, a total of $490 million funds were dedicated to transportation. Going forward, this funding will continue to be allocated to transportation projects in the Commonwealth.

Federal Funding Sources

Most Federal transportation dollars are allocated to States, Regional Transit Agencies, and Tribal lands through formula funding, which is decided by the USDOT Office of the Secretary of Transportation (OST) and Congress. Administrations within USDOT, such as FHWA and FTA, and OST administer competitive discretionary grants. These Administrations put out a Notice of Funding Opportunity (NOFO) to solicit applications from States and transit agencies. They select projects based on various criteria and project funding priorities.

Federal funding for transportation is primarily allocated through formula funding for each State. The Commonwealth of Massachusetts receives substantial Federal funding for transportation infrastructure through several programs, including: [96]

- **National Highway Performance Program (NHPP):** The NHPP provides support for the condition and performance of the National Highway System (NHS), for the construction of new facilities on the NHS, and ensures that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's asset management plan for the NHS.

96 https://www.mass.gov/service-details/funding-considerations.

- **Highway Safety Improvement Program (HSIP):** The HSIP targets a significant reduction in traffic fatalities and serious injuries on all public roads, including both state-and local-owned public roads.

- **Surface Transportation Block Grant (STBG) Program:** The STBG program promotes flexibility in state and local transportation decisions and provides flexible funding to best address state and local transportation needs.

- **Congestion Mitigation and Air Quality Improvement (CMAQ) Program:** The CMAQ program provides a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act.

- **Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Formula Program:** Established in 2021 as part of BIL, the PROTECT program provides funding for resiliency improvements; community resilience and evacuation routes; and at-risk coastal infrastructure. Highway, transit, and certain port projects are also eligible.

- **Carbon Reduction Program (CRP):** This program provides funding for projects that reduce transportation emissions or the development of carbon reduction strategies. States, in consultation with MPOs, are required to develop and update a carbon reduction strategy every five years and submit it to FHWA for approval. Sixty-five percent of a state's CRP funds are to be distributed to areas based on population (suballocated), with the remainder to be used in any area of the state.

- **National Electric Vehicle Infrastructure Formula (NEVI Formula) Program:** The NEVI Formula Program provides funding to strategically deploy electric vehicle (EV) charging infrastructure and establish an interconnected network to facilitate data collection, access, and reliability. Funded projects must be located along designated alternative fuel corridors and the state must submit a plan to FHWA describing the planned use of funds. Ten percent of funding is set aside for discretionary grants to state and local governments that require additional assistance to strategically deploy EV charging infrastructure. This is a non-core formula program and not subject to obligation limitation.

- **Federal Transit Administration (FTA) programs:** Various FTA programs provide formula and competitive discretionary funding for transit in Massachusetts. The largest formula programs for Massachusetts are the Urbanized Area Formula Grant Program (Section 5307) and the State of Good Repair Grants Program (Section 5337).

In addition to formula funds, the Commonwealth's transportation agencies receive funding from other Federal sources. MassDOT applies for Federal Aviation Administration (FAA) grant funds every Federal fiscal year and draws down those approved grant amounts to pay for the Aeronautics Division's project spending. MassDOT also draws down approved grant amounts from the Federal Railroad Administration (FRA) to pay for the Rail and Transit Division, MBTA, and Office of Transportation Planning project spending. MassDOT, the MBTA, regional transit authorities, municipalities, and other entities can apply for Federal funding made available through other competitive programs administered by Federal agencies. Recent discretionary grants include over $30 million in Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grants for three projects in 2023, $996 million in FTA New Starts grants for the Green Line Extension project,

and $4 million in 2023 from the Strengthening Mobility and Revolutionizing Transportation (SMART) grant program. Federal and State earmarks for transportation projects have historically been a common source of project-specific transportation funding. The USDOT administers loans and credit assistance programs, such as the Transportation Infrastructure Finance and Innovation Act (TIFIA) credit assistance program, to provide low-cost financing for large-scale surface transportation projects.

Other Funding

In addition to State and Federal funding, several other sources of funding are used for transportation in the Commonwealth. These include:

- **MBTA and RTA farebox revenues:** An important source of operating revenue for transit agencies, fare revenue stays directly within the agency.
- **MBTA municipal assessments:** Cities and towns within the MBTA service area are required to contribute to the MBTA State and Local Assistance Fund through an assessment based on population.
- **Reimbursable and third-party funds for the MBTA:** This category includes funds received via reimbursable agreements with the Rhode Island Department of Transportation, Amtrak, and other parties.
- **Other MBTA revenue:** The MBTA generates revenue from parking fees in the facilities it owns, advertising on vehicles and at stops and stations, and through real estate revenue sources.
- **Transportation funds from other Commonwealth agencies:** Transportation funding comes in part from other State agencies. One example is the MassWorks Infrastructure Program, which provides competitive grants to support capital investment in infrastructure and includes eligibility for small-town road improvement projects. The Department of Public Utilities (DPU) oversees rideshare services in Massachusetts and collects transportation network company (TNC) fees. These funds are distributed to cities and towns, MassDevelopment, and the Commonwealth's Transportation Fund.
- **Central Artery Tunnel Project Repair and Maintenance Trust Fund (CARM):** A fund for Central Artery/Tunnel infrastructure repairs resulting from substandard construction or design.
- **Municipal contributions to projects and developer mitigation:** This includes funding from municipalities and/or developers that is tied to a specific project.

7.3 Factors That Influence Transportation Funding Levels

The *Beyond Mobility* Action Items identified in Chapter 5 categorized in the areas of capital planning and new programs are most likely to be funded using the resources described in this section. In some cases, programs and projects may need to be re-prioritized to maintain the fiscal constraint of MassDOT's CIP and STIP.

Maintaining existing infrastructure in a state of good repair and delivering new projects to improve the transportation network requires a substantial budget and incremental funding increases to keep pace with inflation. As previously discussed, available funding for transportation comes from a variety of sources. Over time, the Commonwealth's transportation budget has grown steadily to keep pace with resource needs for existing transportation infrastructure and to secure funding for new projects. While the Commonwealth has steady sources of local transportation funding from revenues, fees, tolls, and taxes, many factors can influence the overall forecast of transportation funding levels available, including:

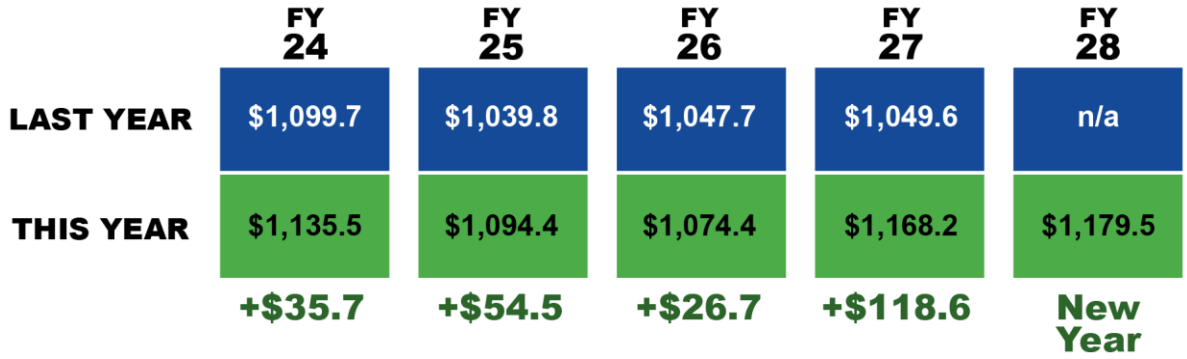
- Revenues generated by traditional sources of funding including motor fuel taxes, sales taxes, and tolls.
- Decisions made by the Commonwealth's legislature and outcomes of the Commonwealth's budget process.
- Allocation of Federal dollars as per formula funding.
- Discretionary funding awards from Federal grant programs.
- Federal legislation that provides funding, such as the recent BIL.

A challenge for transportation agencies when selecting projects and programs to fund is that project costs are expected to inflate by four percent per year, while Federal funding is only expected to increase by roughly two percent per year. If these projections hold, project cost growth will outpace funding growth, resulting in diminished buying power over time.

State Transportation Policy

As previously discussed, the Commonwealth issues bonds to provide the statutorily required State match to Federal aid as well as support State-funded projects and local transportation grant programs. Changes to the bond cap process or changes to the levels of capital funding from this source would have a major impact on transportation funding levels in the future. Figure 7.2 shows year-to-year variations in the baseline level of the bond cap provided to MassDOT by the Executive Office of Administration and Finance (ANF). Baseline bond cap levels—and any adjustments depending on agency needs and requests—are determined on an annual basis as the Commonwealth's rolling five-year CIP is developed.

Figure 7.2 Base Bond Cap Comparison, 2024–2028 versus 2023–2027 (Millions)



Source: MassDOT Capital Investment Plan Update (2024–2028), available at https://www.mass.gov/doc/2024-2028-capital-investment-plan-cip-presentation-to-the-board-on-april-27-2023/download.

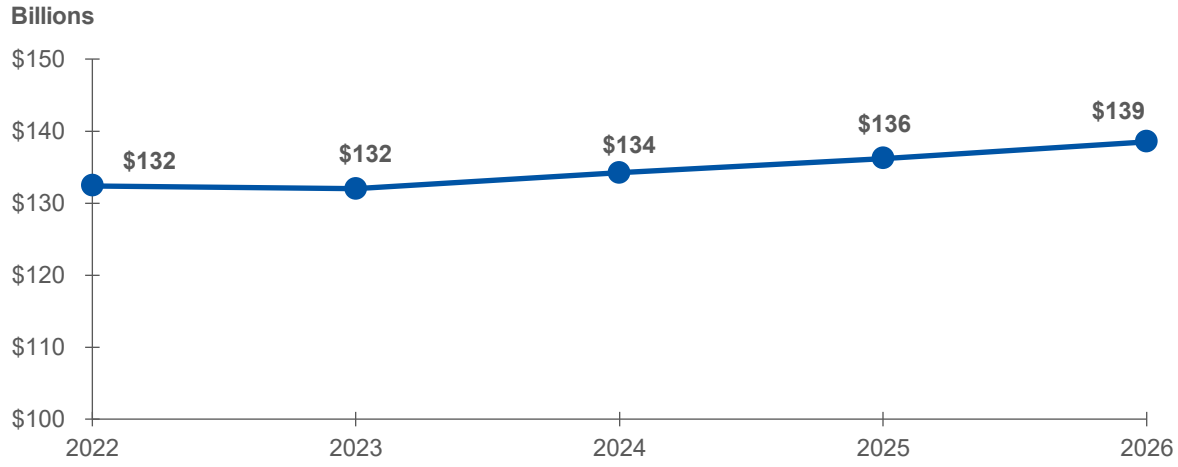
Federal Transportation Policy

Federal transportation policy has a significant impact on transportation funding at the state level. The Federal government appropriates funding for transportation in various ways, including through the annual budget resolution process and by passing standalone bills that enable direct spending in a particular area. Notably, the established funding formulas for transportation are determined by Congress and implemented by USDOT agencies such as FHWA and FTA. This is an example of dedicated transportation funding that is disbursed regularly and upon which states depend.

BIL included historic levels of transportation and infrastructure funding. BIL provides $673.8 billion in transportation funding through 2026, of which $573.5 billion is designated for guaranteed transportation funding.[97] In addition, BIL has placed additional focus and funding into discretionary grant programs, which are awarded through a competitive process and are not guaranteed. Forecasts of Federal transportation funding beyond 2026 are uncertain and dependent on the actions of Congress. Figure 7.3 shows the total transportation funding amounts included in BIL by Federal fiscal year.

97 Bureau of Transportation Statistics, available at https://data.bts.gov/stories/s/cvki-zubk.

Figure 7.3 Total BIL Formula Funding Amounts by Year (Billions)



Source: Bureau of Transportation Statistics, available at https://data.bts.gov/stories/s/cvki-zubk.

Economic and Population Growth

As the economy and the population in the Commonwealth grow over the next 25 years, there will be a corresponding increase in sales tax and motor fuel tax receipts. Any changes to the trajectory of economic and population growth will impact revenues for transportation within the State.

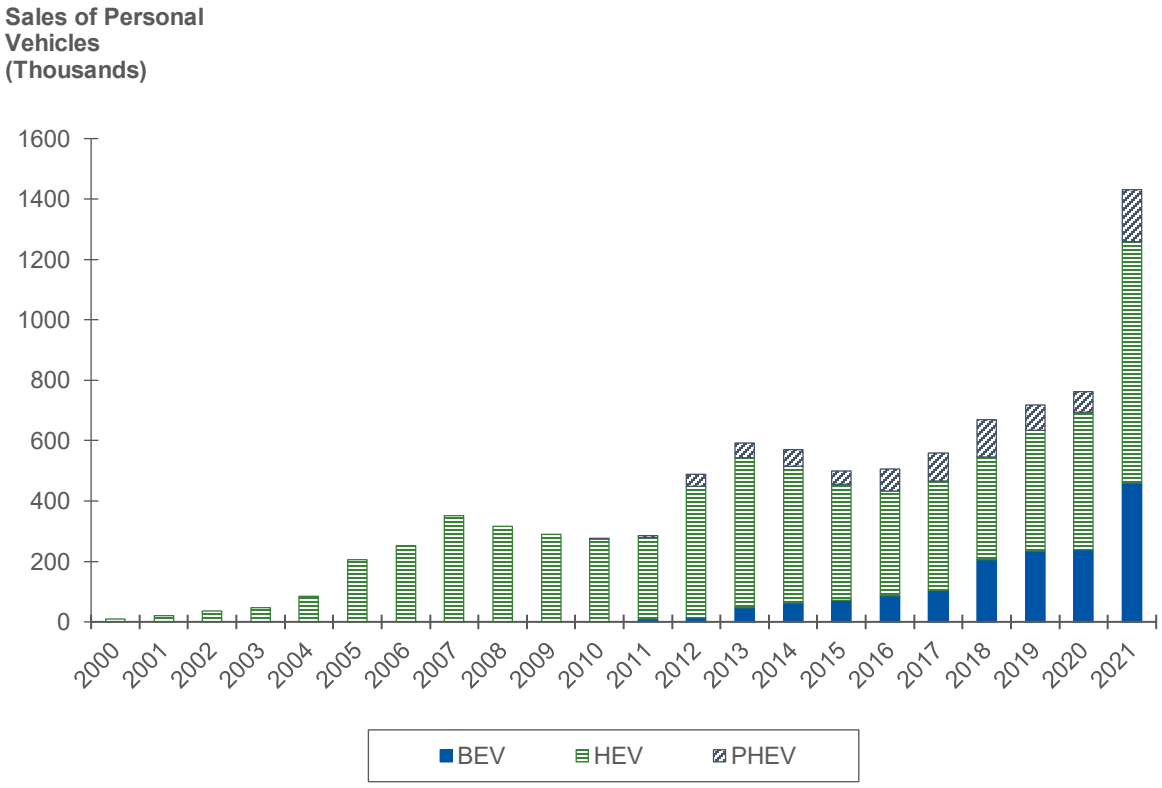
Impact of VMT on Gas Tax and Toll Revenue

Vehicle miles traveled (VMT) can have a significant impact on both gas and toll revenues. The more miles that vehicles travel, the more fuel they consume and the more tax revenue they generate. An increase in VMT generally leads to an increase in gas tax revenue. As VMT increases, more drivers may use toll roads, increasing toll revenue. Conversely, when people drive less, VMT decreases lead to less fuel consumption and changes in route choice may result in drivers paying less in tolls, resulting in a decrease in fuel tax and toll revenues.

Adoption of Electric Vehicles

The transition to electric vehicles will have a significant impact on transportation funding in the medium and long term. The widespread adoption of electric vehicles and state and Federal fuel efficiency standards will help decarbonize the transportation sector, but these trends will also lead to less reliance on gas and diesel fuel. As a result, there will be a decrease in fuel tax receipts, which is a significant source of transportation funding. Sales of battery electric, plug-in hybrid, and hybrid vehicles have risen significantly in recent years, as shown in Figure 7.4.

Figure 7.4 National Sales of Hybrid, Plug-in Hybrid, and Battery Electric Vehicles

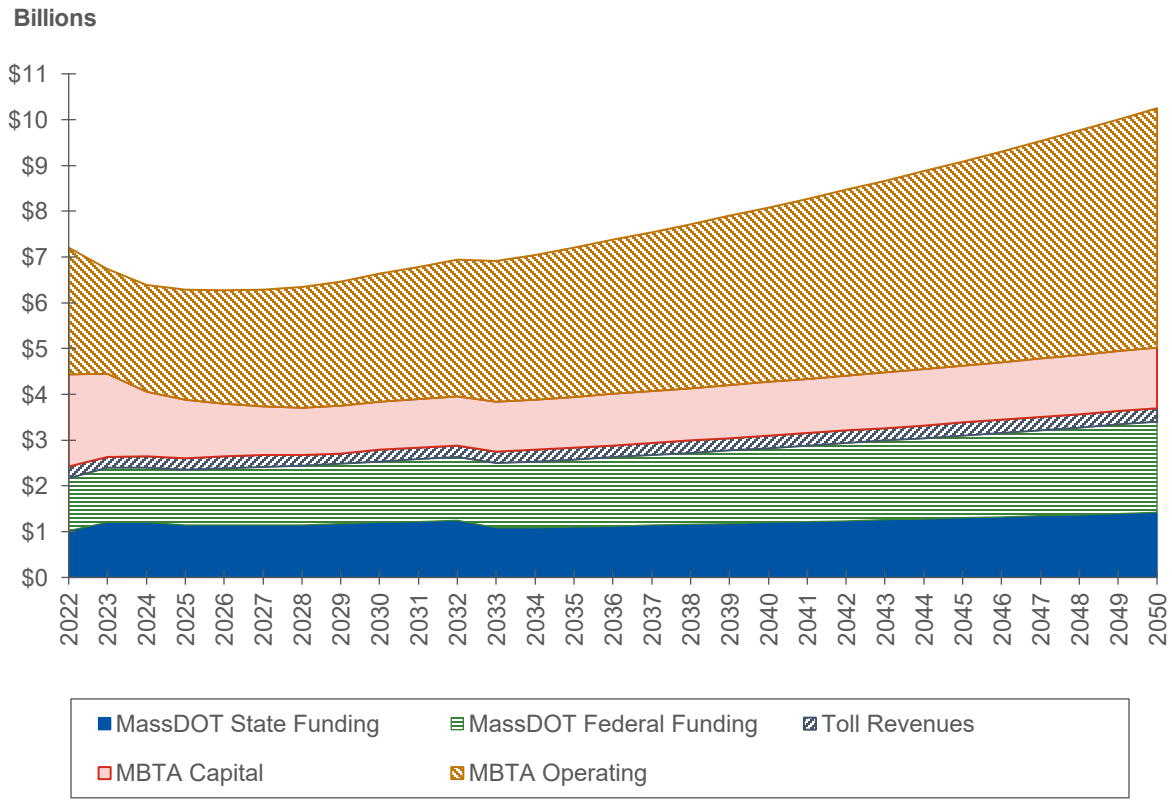


Source: Bureau of Transportation Statistics, available at https://data.bts.gov/dataset/Sales-of-Hybrid-Plug-in-Hybrid-and-Battery-Electri/vy5c-5te7.

7.4 Funding Forecast for *Beyond Mobility*

This funding forecast takes into consideration expected changes to funding levels across all revenue sources. These projections may change over time depending on the state of the economy, national transportation priorities, and State and Federal laws. Based on reasonable expectations of funding growth based on current policy, a 1.3 percent compound annual growth rate in total revenues is forecasted through 2050. Overall revenues are projected to increase from $7.2 billion to $10.2 billion by 2050. Figure 7.5 illustrates the growth of this funding across the categories of State and Federal funding for MassDOT, capital and operating funding for MBTA, and toll revenues.

Figure 7.5 Transportation Revenue Forecast Through 2050

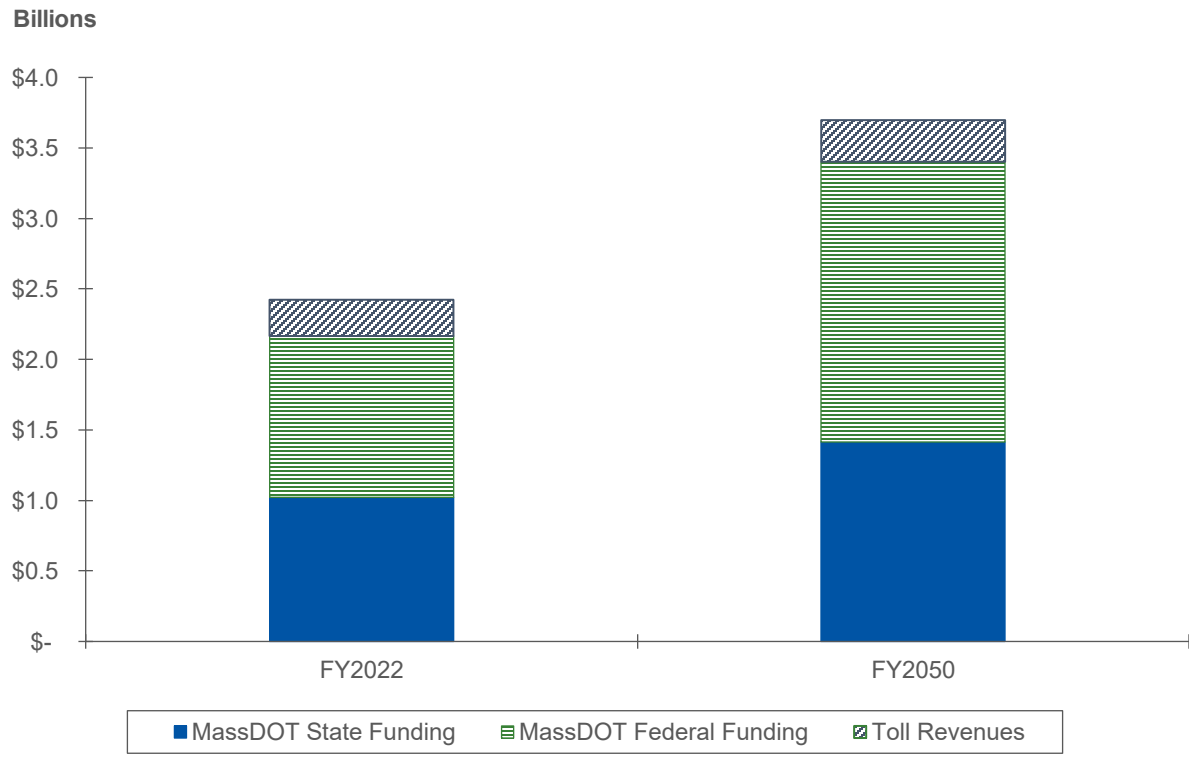


Source: MassDOT and MBTA Projections, Spring 2023.

MassDOT Funding

Revenues for MassDOT, excluding the MBTA, stand at $2.4 billion. Revenue is expected to grow by about 1.5 percent on average each year and to reach $3.7 billion by the year 2050.[98] During this time, it is projected that the revenues and funding levels for the bond cap, Federal assistance, and toll revenues will remain stable and continue to be reliable sources of funding for MassDOT transportation projects. Figure 7.6 provides a comparison of current and expected future revenue for MassDOT.

Figure 7.6 MassDOT FY2022 and FY2050 Projected Revenue



Source: MassDOT and MBTA Projections, Spring 2023.

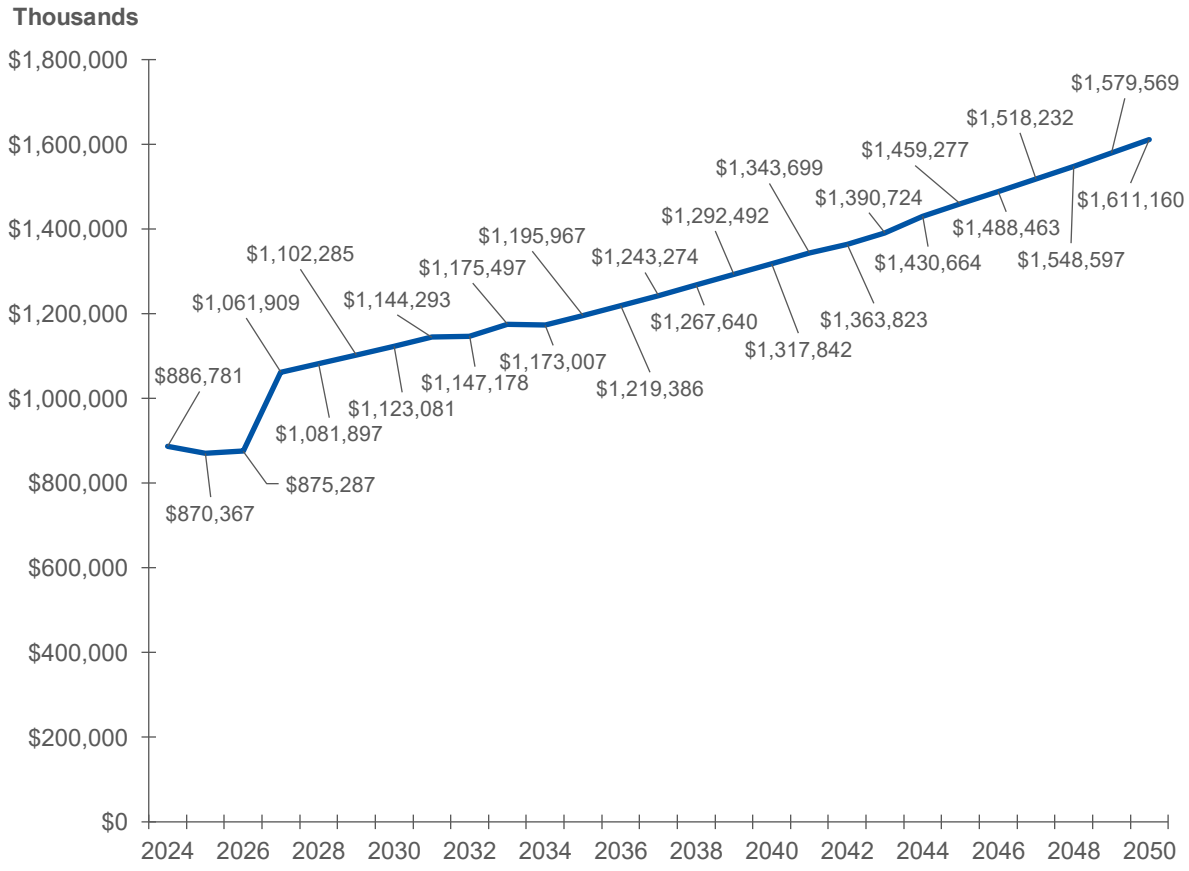
98 Funding source growth rates are based on MassDOT and MBTA projections. Expected long-term growth rates for the state's primary transportation funding sources include two percent for BIL funds, two percent for Bond Cap, one percent for toll revenue, 3.4 percent for MBTA sales tax, 3.5 percent for MBTA fare revenue, and 2.2 percent for MBTA Federal formula funding.

BIL Funding Apportioned to Massachusetts for Roadway Projects

Figure 7.7 represents the total amount of BIL formula funding received by MassDOT for roadway projects minus the amount of Grant Anticipation Notes (GANs) owed. GANs repayments represent debt that is owed on previous bonds that were issued to fund the Accelerated Bridge Program and Next Generation Bridge Program. The total GANs repayments are subtracted from the total Federal formula funding that is received due to funds being reimbursed for the use of future Federal formula dollars.

As shown in Figure 7.7, after accounting for GANs repayments, MassDOT is a recipient of $886.8 million of Federal BIL formula funding in fiscal year 2024 and is estimated to receive $1.6 billion in 2050. The reason the amount of funding decreases between 2024 and 2026 and again between 2031 and 2032 is a result of the GANs repayment schedule (shown in Table 7.1), which increases in these years.

Figure 7.7 Total Highway BIL Formula Funding Amounts Apportioned to Massachusetts by Year Accounting for GANs Repayments (Thousands)



Source: MassDOT Analysis Combining Federal Highway Administration BIL Apportionment Notices and GANs Repayments. Spring 2023 analysis.

Table 7.1 Estimated Massachusetts Grant Anticipation Notes (GANs) Repayment Schedule (FY2024–FY2050)

Year	GANs Repayment	Year	GANs Repayment
2024	$93,985,000	2038	$30,000,000
2025	$122,185,000	2039	$30,000,000
2026	$133,620,000	2040	$30,000,000
2027	$0	2041	$30,000,000
2028	$0	2042	$35,000,000
2029	$0	2043	$35,000,000
2030	$0	2044	$25,000,000
2031	$0	2045	$0
2032	$15,000,000	2046	$0
2033	$10,000,000	2047	$0
2034	$30,000,000	2048	$0
2035	$30,000,000	2049	$0
2036	$30,000,000	2050	$0
2037	$30,000,000		

Source: MassDOT Analysis of MA Administration & Finance GANs repayment schedule, Spring 2023 analysis.

State of Good Repair Investment

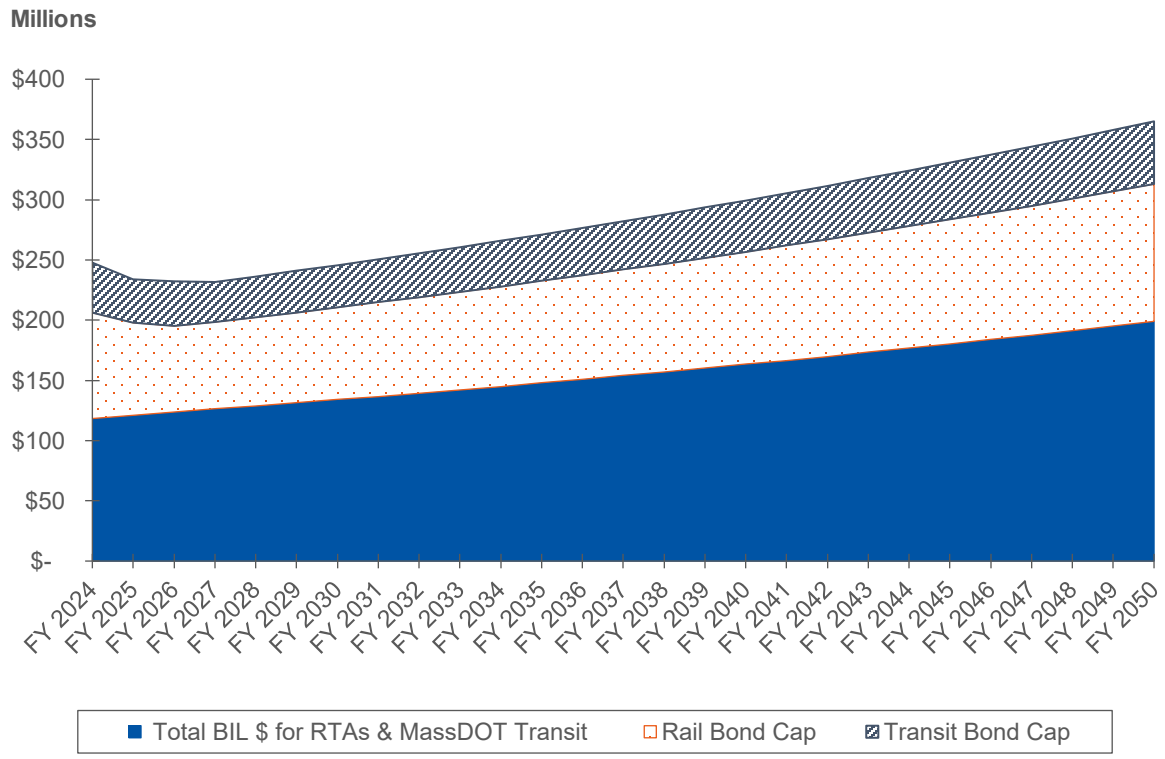
As part of this section, it is important to note that combined State and Federal investments are needed to ensure that Massachusetts' bridges and pavement are in a state of good repair, and that these investments are often critical as a precursor to investments that modernize the transportation system. As documented in MassDOT's 2023 *Transportation Asset Management Plan* (TAMP), Massachusetts has the fourth-largest percent in the nation of its National Highway System (NHS) deck area in poor condition, and is 15th worst in the nation for the number of poor bridges. Massachusetts is one of five States that exceeds the Federal minimum condition threshold in this area. The historical performance of MassDOT's bridges is marked by year over year volatility due to large structures becoming poor or replaced and affecting performance in proportion to size. It's also evident that the Massachusetts Accelerated Bridge Program ($3 billion, major construction 2008-2018) was successful in controlling the backlog growth but sustained high levels of investment are needed to make meaningful, long-term progress. Many of the funding sources documented in this section (as well as state funding for the Next Generation Bridge Program, to be repaid with Federal funds) will continue to address these issues.

MassDOT Rail and Transit Division and the Regional Transit Authorities

MassDOT RTD and the RTAs receive funding through both BIL and the bond cap. BIL funding for RTD and the RTAs is $118 million in FY2024 and is expected to grow at two percent per year through FY2050.

Bond cap revenue for rail projects is expected to grow by two percent per year, from $50 million in FY2022 to $113 million in FY2050. For transit projects, bond cap revenue is expected to fall somewhat between FY2022 and FY2027, then grow at two percent per year reaching $52 million by FY2050. Figure 7.8 shows the total BIL and bond cap funding expected for RTD and the RTAs.

Figure 7.8 Total Estimates of Federal Reauthorization and Bond Cap Money for RTD and RTAs



Source: MassDOT Projection, Spring 2023.

MassDOT Aeronautics Division

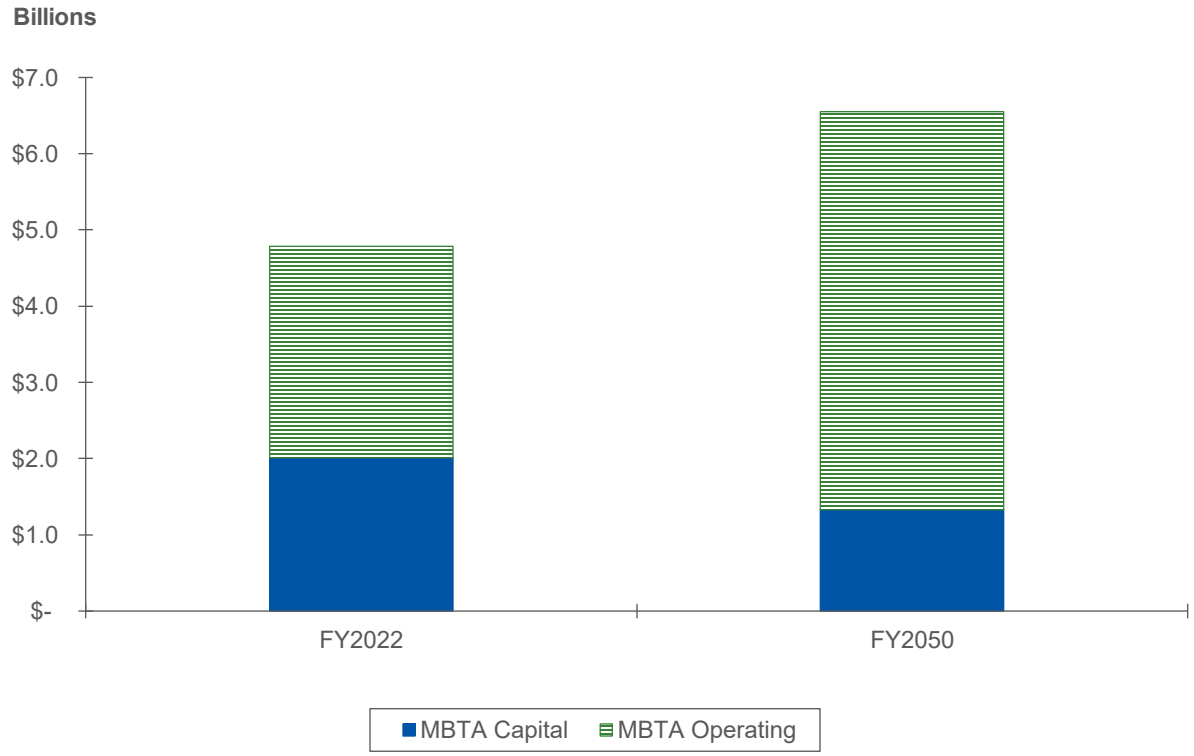
The Aeronautics division is expected to receive $244 million in aeronautics grants from the FAA through BIL, representing a steady $48.8 million per year. With up to a 10 percent State match from bond cap funding, Aeronautics revenues are expected to be about $54.2 million per year throughout the forecast period.

MBTA Funding

The MBTA manages one of the largest public transportation systems in the country and had a combined operating and capital budget of $4.7 billion in FY2022. Over the next 25 years, the MBTA's revenues are expected to increase by 1.1 percent annually overall, with a decrease through FY2027 followed then by increases of roughly 2.5 percent per year, growing to $6.5 billion by 2050. Capital revenues are expected to comprise the largest part of revenue decreases over the next several years as the MBTA completes major infrastructure projects. Operating-specific revenues are expected to more than double by 2050, primarily driven by forecasted growth in sales tax revenues.

Figure 7.9 compares MBTA operating and capital revenue in FY2022 and revenue forecasts for FY2050.

Figure 7.9 MBTA FY2022 and FY2050 Projected Revenue



Source: MBTA Revenue Project, 2022.

8.0 Conclusions

In November of 2024, MassDOT turns fifteen years old. When it comes to ensuring we are prepared for our next fifteen years and beyond, we are at a critical juncture. As a result of the Federal BIL of 2021, MassDOT has more funding resources now than it has had in the past. At the state level, the Healey-Driscoll Administration's Transportation Funding Task Force will be developing recommendations for a long-term, sustainable transportation finance plan that looks well into the future.

As the specifics surrounding how resources are allocated take shape, the Problem Statements and Action Items included in *Beyond Mobility* are guideposts for MassDOT and the MBTA. Informed by rigorous data-driven analysis and over 5,000 pieces of community feedback with a focus on historically underserved residents, the priorities and actions described in this Plan are directly reflective of the transportation needs that the people of our Commonwealth are facing.

Chapter 5 highlights a number of ongoing activities, projects, and programs that MassDOT and the MBTA are already involved in that address these needs. Although current initiatives represent great progress, we know there is more work to do. Pedestrian and bicycle crashes, for example, remain heavily concentrated in our Gateway Cities; the lack of predictable travel times (whether due to congestion or transit delays) continue to frustrate our residents; severe weather is worsening and further damaging transportation infrastructure across the Commonwealth; and major investments in clean transportation, transit-oriented development, and carbon-free transportation modes are needed to meet our climate goals. Additionally, there has been historic underinvestment in certain communities, such as Massachusetts' Gateway Cities; this underinvestment has generated significant inconsistencies in how these communities are affected by and able to benefit from the transportation system. These communities also experience a disproportionate share of burdens, including high travel times, crash rates, and levels of pollution.

The actions described in *Beyond Mobility* will set MassDOT and the MBTA up to address these and other challenges head on, and contribute to an equitable and resilient transportation system that all Massachusetts residents and visitors can depend on.

MassDOT cannot solve all of the problems described in this Plan alone. The voices, experiences, and respective areas of expertise of Massachusetts' residents, elected and appointed officials, community-based organizations, and other stakeholders are crucial to addressing the transportation needs of today, and anticipating the challenges and opportunities of tomorrow. MassDOT encourages all Massachusetts communities to use this Plan as a call to action to highlight key problems and serve as a foundation for ongoing planning, research, and advocacy.

A reliable transportation system is critical to ensure that our residents—especially those who do not have the luxury of owning one or more vehicles—can access their jobs, important health care for themselves or loved ones, recreational opportunities, and other places they need to go. Transportation is more than just a way to get around; it is a lifeline. This is why we must continue to move beyond planning for the sake of mobility alone, and toward planning for a sustainable transportation system that prioritizes safe and reliable access to opportunity for those who need it most.

Thank you

July 2024

Beyond Mobility
Massachusetts 2050 Transportation Plan

Appendix A: Public Engagement Approach & Results

Final Plan

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1.0 Introduction

Beyond Mobility creates a blueprint for guiding transportation decision-making and investments in Massachusetts, while also advancing the vision for transportation and maximizing the equity and resiliency of the transportation system. This process updates the Massachusetts Department of Transportation's (MassDOT) *weMove Massachusetts*, the 2014 Statewide Long Range Transportation Plan (SLRTP). Engaging with residents and stakeholders was fundamental to developing *Beyond Mobility*, which depends heavily on public guidance to establish a shared vision for transportation in the Commonwealth.

This document summarizes the approach and results of a robust public engagement strategy that is inclusive, accessible, and approachable. The public engagement approach followed Federal and state laws and guidelines and provides a framework to ensure effective engagement. The input needed to inform *Beyond Mobility* required distinct engagement techniques to connect with different groups of people. This Appendix documents tools, techniques, and strategies to achieve effective participation.

The core public engagement philosophy was built around the principles of inclusivity and meeting people where they are. Hearing underrepresented voices requires public engagement across every form of communication and outreach. While many people benefit from virtual outreach and social media posts, just as many individuals lack reliable Internet and technology services, cannot travel easily, and/or sit for multi-hour public meetings. *Beyond Mobility* aimed to reach these people as well. Many engagement activities reached beyond the traditional stakeholders of past statewide transportation planning initiatives by lowering barriers to entry and building public trust. This allowed historically underrepresented communities throughout Massachusetts to connect with the planning process and for MassDOT to build ongoing relationships with the residents and stakeholders who participated. Ultimately, this holistic public engagement allowed for inclusive and data-informed decision-making.

The subsequent sections summarize how MassDOT engaged communities in the planning process, including by:[1]

- Establishing early and ongoing engagement opportunities that provide relevant information about transportation issues and the decision-making processes to individuals, affected public agencies, and employees in public transportation, public ports, freight shippers, private transportation providers (like intercity bus), and shuttle operators, as well as those who use public transportation, pedestrian walkways, and bicycle facilities, including individuals who are disabled, provide freight transportation services, and others.

- Providing reasonable public access to information used to develop *Beyond Mobility*.

[1] *Subpart A: Transportation Planning and Programming Definitions.* Part 450: Planning Assistance and Standards. Code of Federal Regulations. https://www.ecfr.gov/current/title-23/part-450.

- Providing adequate public notice of public engagement activities and time for the public to review and comment at key decision points, including a reasonable opportunity to comment on the final *Beyond Mobility* plan.
- Ensuring public meetings were held at convenient and accessible locations and times.
- Using visualization techniques to describe the proposed *Beyond Mobility* recommendations and supporting studies.
- Making public information available in electronically accessible formats across the Internet.
- Demonstrating explicit consideration and response to public input while developing *Beyond Mobility*.
- Including a process for seeking out and considering the needs of those historically underserved by existing transportation systems, such as low-income and minority households.

2.0 Stakeholder Identification

As a starting point for engagement, a stakeholder database was developed to include previous stakeholders across MassDOT's divisions and previous planning efforts. This initial set of stakeholders, summarized in Table 2.1, was developed in coordination with MassDOT's Office of Diversity and Civil Rights. The database was updated as *Beyond Mobility* progressed to include those participants who expressed an interest in staying engaged in the planning process.

Table 2.1 Stakeholder Categories, Targeted Groups & Engagement Activities

Stakeholder Category	Targeted Groups	Public Meetings	Community Activations	Multilingual Focus Groups & Interviews	Meeting-in-a-Box	Custom Presentation	Stakeholder Interviews	Website	Social Media	Surveys	Email Marketing	Ethnic Paid Media
General Public	○ Multilingual Community Leaders	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	○ Previously Hard to Reach Communities—including Brockton, New Bedford, Lawrence, Lowell, Framingham, Worcester, Chelsea, Boston: Dorchester, East Boston, Mattapan, Roxbury, Springfield, and Pittsfield	–	Yes	–	–	–	–	–	–	–	–	–
	○ Outer Cape Focus Group	–	–	–	Yes	–	–	–	–	–	–	–
Local, Regional, State and Federal Agencies, Tribal Governments, and Organizations	○ Metropolitan Planning Organizations (MPOs)	–	–	–	Yes	–	–	–	–	–	–	–
	○ City of Boston	–	–	–	–	–	Yes	–	–	–	–	–
	○ Federal and State Recognized Tribes	–	–	–	–	Yes	–	–	–	–	–	–
	○ Locally Elected Officials	–	–	–	–	Yes	–	–	–	–	–	–
	○ Regional Planning Agencies	–	–	–	–	Yes	Yes	–	–	–	–	–
	○ Massachusetts Department of Public Health	–	–	–	–	Yes	–	–	–	–	–	–
Affected Public Agencies, Groups, and Individuals	○ Berkshire Regional Coordinating Council on Transportation	–	–	–	–	Yes	–	–	–	–	–	–

Stakeholder Category	Targeted Groups	Public Meetings	Community Activations	Multilingual Focus Groups & Interviews	Meeting-in-a-Box	Custom Presentation	Stakeholder Interviews	Website	Social Media	Surveys	Email Marketing	Ethnic Paid Media
	Massachusetts Association of Regional Transit Authorities	–	–	–	–	Yes	–	–	–	–	–	–
	Massachusetts Municipal Association	–	–	–	–	Yes	Yes	Yes	Yes		Yes	–
	Massachusetts Public Health Association	–	–	–	–	Yes	Yes	–	–	–	–	–
	League of Women Voters—Massachusetts	–	–	–	–	Yes	–	–	–	–	–	–
	Western MA Transportation Advocacy Network	–	–	–	Yes	Yes	–	–	–	–	–	–
	Worcester Community Action Council	–	–	–	Yes	–	–	–	–	–	–	–
Business Organizations	Massachusetts Business Roundtable	–	–	–	–	Yes	–	–	–	–	–	–
	Massachusetts Chamber of Commerce Policy Network	–	–	–	–	–	Yes	–	–	–	–	–
	Massachusetts Competitive Partnership	–	–	–	–	Yes	–	–	–	–	–	–
	Regional and Local Chambers of Commerce	–	–	–	–	Yes	–	–	–	–	–	–
	Massachusetts Business Roundtable	–	–	–	–	Yes	–	–	–	–	–	–
	Asian American Civic Association	–	–	–	–	–	–	Yes	Yes	Yes	Yes	–

Stakeholder Category	Targeted Groups	Public Meetings	Community Activations	Multilingual Focus Groups & Interviews	Meeting-in-a-Box	Custom Presentation	Stakeholder Interviews	Website	Social Media	Surveys	Email Marketing	Ethnic Paid Media
Community and Environmental Groups	Boston Harbor Now	–	–	–	–	–	Yes	–	–	–	–	–
	Coalition for Social Justice	–	–	–	–	–	Yes	–	–	–	–	–
	Great Neighborhoods Network	–	–	–	–	–	Yes	–	–	–	–	–
	Massachusetts Councils on Aging	–	–	–	–	Yes	–	–	–	–	–	–
	Massachusetts Healthy Aging Collaborative	–	–	–	–	Yes	–	–	–	–	–	–
	Massachusetts Immigrant and Refugee Advocacy Coalition	–	–	–	–	–	Yes	–	–	–	–	–
	Transit Matters	–	–	–	–	–	Yes	Yes	Yes	Yes	Yes	–
	Transportation for Massachusetts	–	–	–	–	–	Yes	–	–	–	–	–

Stakeholder Category	Targeted Groups	Public Meetings	Community Activations	Multilingual Focus Groups & Interviews	Meeting-in-a-Box	Custom Presentation	Stakeholder Interviews	Website	Social Media	Surveys	Email Marketing	Ethnic Paid Media
Users of Pedestrian, Bicycle Facilities, and Public Transportation	The Massachusetts Bicycle and Pedestrian Advisory Board (MABPAB)	–	–	–	–	Yes	Yes	–	–	–	–	–
	WalkMassachusetts (formerly WalkBoston)—WalkMassachusetts Network	–	–	–	–	Yes	–	–	–	–	–	–
	Western Massachusetts Transportation Advocacy Network	–	–	–	–	Yes	–	–	–	–	–	–
Representatives of Public Transit Employees	Transit employees	–	–	–	–	Yes	–	–	–	–	–	–
Freight Transportation Stakeholders	Massachusetts Freight Advisory Committee	–	–	–	–	Yes	–	–	–	–	–	–
	MassPort	–	–	–	–		Yes	–	–	–	–	–
Private Providers of Transportation	Regional Transit Authorities	–	–	–	–	Yes	–	–	–	–	–	–
	Regional Bus Carriers (Peter Pan Bus Lines, Megabus, Greyhound, etc.)	–	–	–	–	Yes	–	–	–	–	–	–

– (endash) = No

3.0 Public Engagement Framework

The public engagement framework that supported *Beyond Mobility* aligns the audience, tools, and techniques with key milestones where stakeholders, partners, and customers can influence and guide the development of the Plan. Several key phases of outreach were designed to gather public feedback to inform the direction of and decisions within *Beyond Mobility* (Figure 3.1). While Phase 1 focused on sharing information, Phases 2 through 4 focused on gathering public insights to inform and advance the planning process.

Figure 3.1 Public Engagement Framework

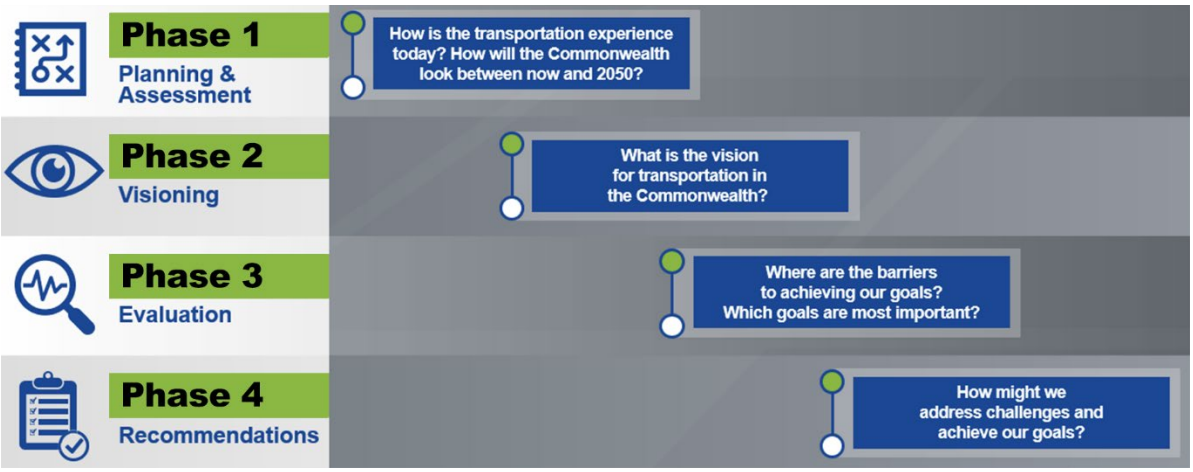

Phase 1
Planning & Assessment
How is the transportation experience today? How will the Commonwealth look between now and 2050?
Phase 2
Visioning
What is the vision for transportation in the Commonwealth?
Phase 3
Evaluation
Where are the barriers to achieving our goals? Which goals are most important?
Phase 4
Recommendations
How might we address challenges and achieve our goals?

Table 3.1 through Table 3.4 describe the key information and techniques used during each of the four phases of engagement.

Phase 1: Planning and Assessment. Phase 1 focused on planning and assessment, which provided a foundation for seeking input on the vision, values, and policy problem statements in subsequent phases. Key findings related to existing conditions, scenario planning, financial planning, and strategic planning gap analysis.

Table 3.1 Key Information and Engagement Techniques, Phase 1

Key Information or Input Shared/Sought	Key Techniques Used
○ Conditions and performance of the current transportation system. ○ Trends impacting transportation. ○ Transportation funding process and constraints.	○ Website updates: public engagement plan to review figures and frequently asked questions.

Phase 2: Defining Vision, Values, Policy Problem Statements, and Transportation Barriers. Phase 2 focused on defining the vision, values, and policy problem statements. Existing conditions, future trends, and scenarios impacting transportation set the stage for understanding the *Beyond Mobility* vision for transportation.

Table 3.2 Key Information and Engagement Techniques, Phase 2

Key Information or Input Shared/Sought	Key Techniques Used
○ What do you like most about how you get around in Massachusetts? What do you like least? ○ In your opinion, what are the biggest challenges facing transportation in Massachusetts today? ○ What is one aspect about the current transportation system you want preserved or maintained in your lifetime? ○ What is one aspect about the current transportation system you want improved or changed in your lifetime? ○ How do you see people using the transportation system? Is it working for them? ○ Do you think people feel the transportation system is on the right track for the future? ○ What challenges are individuals facing and how can transportation help? ○ What is your vision for the future of transportation in Massachusetts? ○ What transportation services, programs, policies, or infrastructure do people need to see changed, built, or protected? Why? ○ Should any current transportation services and/or systems be reduced and/or removed? Why? ○ What current barriers do you see preventing access to transportation systems and services? How can these barriers be removed?	○ Multilingual community focus groups and interviews. ○ Stakeholder interviews and advisory committee meetings. ○ Social media posts focusing on opportunities to provide public comments. ○ Survey accessed at project website through email blast, project website, a QR code shared at the activations and social media promotion. ○ Map-based interactive survey(s) accessed through email blast, project website, and social media posts.

Phase 3: Tradeoffs Across Priorities. Phase 3 built an understanding of how available funding and other barriers impact the ability to achieve the Plan's vision. Engagement focused on understanding tradeoffs, prioritization across goals, and informing the recommendations, draft, and final Plan. This phase used the budgetary programs within MassDOT's *Capital Investment Plan* (CIP) to ask stakeholders and members of the public to make tradeoffs between budget programs based on their transportation priorities. These participatory budgeting-style exercises framed tradeoffs between budgetary program sizes and potential performance and outcomes (e.g., a 10 percent reduction in Bridge Program funding could lead to a three percent reduction in bridges in "good" condition, while a 10 percent increase in the Bicycle and Pedestrian program could lead to a six percent increase in the length and number of protected bicycle lanes. What is the preferred allocation of this funding?).

Table 3.3 Key Information and Engagement Techniques, Phase 3

Key Information or Input Shared/Sought	Key Techniques Used
○ What does a successful transportation system look like to you? ○ How would you invest and prioritize limited resources? ○ How do you think priorities should be assessed and evaluated? ○ In your mind, what tradeoffs are acceptable? Unacceptable? ○ If you could spend $100 on transportation, how would you allocate each dollar? (Pre-defined list separated by mode could include, transit-supportive infrastructure, bike and ped infrastructure, bike share/micromobility, park and ride lots and other congestion relief efforts.)	○ In-person community activations with a kiosk at high traffic outdoor locations in strategic Massachusetts neighborhoods collecting answers to key questions. ○ Virtual public meeting with engagement exercises and opportunity for question and answers. ○ Program-level participatory budgeting exercises and/or survey questions asking participants/ respondents to rank funding priorities across various capital programs. ○ Survey focused on understanding general perceptions of tradeoffs and goals. ○ Stakeholder interviews and advisory committee meetings. ○ Social media posts sharing opportunities for public feedback.

Phase 4: Reviewing Recommendations. Phase 4 compiled findings of the planning process into a set of recommendations and a draft Plan. In this planning phase, the Plan acknowledged the resources available for MassDOT to address challenges and achieve the goals determined in the previous plan phases. Engagement focused on the draft plan, feedback on the engagement process, and shared action steps to achieve the vision for transportation.

Table 3.4 Key Information and Engagement Techniques, Phase 4

Key Information or Input Shared/Sought	Key Techniques Used
○ Do you agree with the recommendations made? If not, what would you recommend? ○ Do you feel your concerns have been heard and acknowledged? ○ Do you think your neighborhood has been effectively represented? ○ Do you believe your representatives and constituencies have been well informed to serve your community's needs? ○ Do you think people collectively feel their concerns, constituencies, or organizations were heard? ○ How will you help bring our shared vision for MassDOT's transportation future into reality? ○ Will your organization and/or neighborhood look forward to working with MassDOT again on the next planning process? If not, how can MassDOT improve working with you?	○ Social media posts directing followers to draft plan for public feedback. ○ Video series to share draft plan components in a public-friendly way. ○ Stakeholder interviews and advisory committee meetings. ○ Comment form accessed through email blast, project website, social media and public meetings.

4.0 Engagement Results

Throughout the *Beyond Mobility* planning process, different engagement techniques were used based on environment and purpose. Virtual, live, and digital models allowed a larger and inclusive approach to participation. Geographic coverage of live events and outreach activities was critical for the outreach strategy along with offering geographically appropriate language options, providing enhanced access to historically underserved populations in their communities.

4.1 Meetings-in-a-Box

"Meeting-in-a-Box" is a technique designed for existing community groups or other organized groups to gather and share opinions about a plan or project impacting their community. Meeting kits were prepared so existing groups could facilitate the discussion and provide feedback. The objective of these meetings was to hear from communities and groups whose perspectives were missing from the broader ongoing engagement efforts to ensure they were captured as part of development of *Beyond Mobility*.

Table 4.1 summarizes the Meetings-in-a-Box held throughout the planning process.

Table 4.1 Meeting-in-a-Box Summary

Group	Meeting Date
Berkshire MPO & Transportation Advisory Committee	December 20, 2022
Amherst Transportation Committee	January 3, 2023
Western Mass Transit Advocacy Network	January 12, 2023
Greater Worcester Community Foundation	January 20, 2023
Outer Cape Focus Group	January 26, 2023
SRPEDD Focus Group	January 27, 2023
Worcester Community Action Council	February 8, 2023
Health Equity Partnership of North Central Massachusetts (CHNA9)	February 16, 2023
Berkshire Regional Coordinating Council on Transportation	March 6, 2023

The main themes that emerged from these meetings fell into several broad categories: **connectivity and equity, improved transit experience, infrastructure investment and operations,** and **building organizational capacity**. Specific points associated with each of those categories included:

- **Connectivity and Equity Needs**
  - Transit stops and stations lack sufficient bicycle and pedestrian accommodations.
  - Mobility needs differ significantly across the state—on demand transit and micro-transit are realistic solutions to support mobility in Western Massachusetts now.

- People desire passenger rail service for the entire state.
- Individuals who cannot drive lack sufficient and affordable options to reach healthcare services.
- State airports are only accessible by automobile.
- Rural communities lack meaningful transportation options to reach cities and other activity centers.
- Wayfinding signs, painted paths, and directories must increase at transit stations to connect people to key destinations.
- Lack of affordable housing is forcing people away from existing transit networks and increasing reliance on automobiles.
- 27 percent of participants feel pedestrian and bicycle connections are a top funding priority.
- 26 percent of participants want better connections to jobs.
- 21 percent of participants feel connectivity and coverage must be prioritized when funding projects.
- 21 percent of participants want better connections to healthcare services.

Improved Transit Experience

- Western Regional Transit Authorities (RTAs) cater their service to universities which leaves residents with unreliable transit during school breaks.
- Expand evening transit services.
- RTAs should consider vans during periods of low ridership to cut costs.
- Expand RTA bus fleets and improve accommodations to support users of all ages and abilities.
- Ensure transit reliability statewide (50 percent of Cape Cod workforce lives off the Cape).
- Bus shelters at all stops to encourage year-round ridership.
- Rural transit hubs require folks come downtown to access transit that connects to destinations outside the city.
- 18 percent of participants feel community shuttle services are necessary to improve the transit network locally and regionally.
- Micro-transit was cited frequently as a need in rural areas where fixed transit will likely not be relevant in the near future.
- 20 percent of participants feel more frequent bus service is the most important feature to improve on the transit network.

Infrastructure Investment and Operations

- Prioritize intersection safety projects and Intelligent Transportation Systems (ITS).
- Better first- and last-mile connections for existing and any new transit services.

- Improvements to local roads and bridges do not have to be part of major projects: potholes, road lines, and sign improvements are needed intermittently.
- Climate resilient infrastructure must be incorporated in every project to prepare for sea level rise, flooding, and extreme weather.
- Bus-only lanes connecting to transit hubs and major activity centers.
- 51 percent of participants think transit improvements are the most important funding priority for the state.
- 20 percent of participants feel the most important features to improve on roadways are pedestrian and bicycle infrastructure.
- 17 percent of participants feel more bus-only lanes are a priority.

- **Building Organizational Capacity**

  - Municipalities often lack the capacity to maintain new infrastructure as part of Complete Streets projects and other MassDOT investments.
  - New Chapter 90 formula funding and additional funding are needed to help communities take advantage of grant opportunities.
  - Additional RTA staff to operate community shuttle services that would get people to, from, and around major activity centers.
  - Increase vehicle capacity and numbers to provide access to care givers to be transported with patients to appointments.
  - RTAs must provide more opportunities for public input and improve communication of available services and changes.

The key takeaways overall from the Meeting-in-a-Box were:

- Individuals who lack the ability to drive face many barriers, including access to affordable transportation alternatives. Availability of options is the greatest barrier, followed by cost. Some services also lack appropriate features to support various needs and abilities.
- Dedicated transit services to access critical destinations across the state, especially jobs, childcare and medical facilities, does not exist. This greatly limits where people can live and age affordably.
- Rural populations that lack transit infrastructure view the transition to electric vehicles in their communities as critical to meeting climate and sustainability goals.
- Municipalities across the state struggle to stay on top of funding opportunities and require dedicated assistance from MassDOT for planning studies, grant writing, and project development. Chapter 90 funding is not enough to support these needs.
- Rural populations feel isolated and without sufficient transportation options due to lack of transit service and incomplete bicycle and pedestrian networks.

4.2 Community Activations

Community activations, held from August 18, 2022 through September 27, 2022, were designed to foster opportunities for community engagement with *Beyond Mobility*. The planning process included 11 community activations which were spread across the state: Roxbury, Lynn, Mattapan, Lowell, Lawrence, New Bedford, Brockton, Worcester, Springfield, Framingham, and Pittsfield. Cities and locations were selected based on the following characteristics:

- Contained some of the largest concentrations of Massachusetts' underserved communities.
- Situated in a heavily trafficked area during a busy time.
- Provided access to people using multiple modes of transportation.

Each community activation was personalized to the location's needs, including kiosks at high profile public events and along heavily traveled routes on certain days during busy times. Table 4.2 indicates the locations and outcomes of each community activation.

Figure 4.1 Nubian Station Community Activation

Figure 4.2 Lowell and Lawrence Community Activation

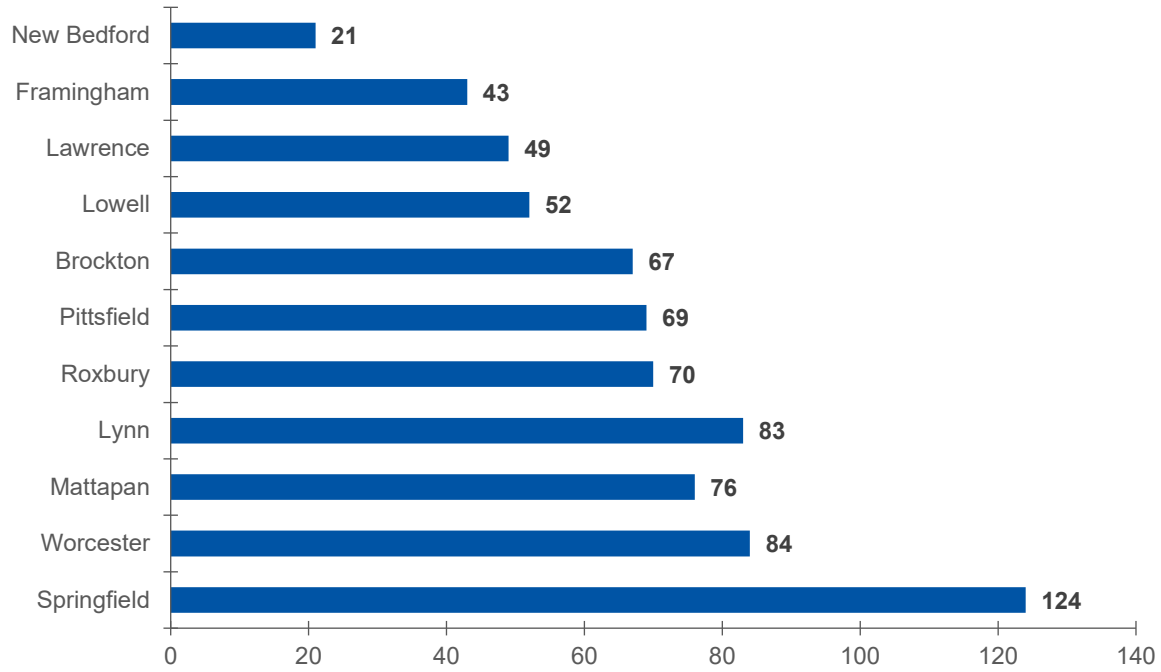
Table 4.2 Community Activations Overview

City/Date	Location	Summary of Results
Boston—Mattapan 9/9/22	**Location 1:** Bus Station Blue Hill Ave (busier than T-station due to nearby stores) **Location 2:** Mattapan T-station	○ 76 unique survey participants who were heavily reliant on transit buses and subways for transportation. ○ 56% of participants were male. ○ 37% were between the ages of 45 to 64. ○ 96% of participants self-identified as non-white. ○ 17% identified as Hispanic.
Boston—Roxbury 9/6/22	**Location 1:** Nubian Station	○ 70 unique survey participants who were heavily reliant on transit buses and subways for their selected transportation modes. ○ 46% of participants were female. ○ 46% were between the ages of 45 to 64. ○ 94% of participants identified as non-white. ○ 31% of participants identified as Hispanic.
Brockton 9/19/22	**Location 1:** BAT main bus station **Location 2:** Market Basket	○ 67 unique survey participants who were heavily reliant on transit buses and subways for their selected transportation modes. ○ 58% of participants were female. ○ 30% were between the ages of 35 to 44. ○ 69% of participants self-identified as non-white. ○ 33% of participants identified as Hispanic.
Framingham 9/27/22	**Location 1:** Commuter Rail station **Location 2:** Stop 'n Shop	○ 43 unique survey participants who were heavily reliant on transit buses and private vehicles for their selected transportation modes. ○ 56% of participants were male. ○ 40% were between the ages of 45 to 64. ○ 40% of participants self-identified as non-white. ○ 26% identified as Hispanic.
Worcester 9/20/22	**Location 1:** WRTA Union Station bus section **Location 2:** Polar Park	○ 84 unique survey participants who were heavily reliant on transit buses and subways for their selected transportation modes. ○ 50% of participants were female. ○ 31% were between the ages of 35 to 44. ○ 39% of participants self-identified as non-white. ○ 43% of participants identified as Hispanic.
New Bedford 9/17/22	**Location 1:** Market Basket (adjacent to a bus terminal).	○ 21 unique survey participants who were heavily reliant on transit buses and private vehicles for their selected transportation modes. ○ 71% of participants were female. ○ 38% were between the ages of 45 to 64. ○ 62% of participants self-identified as non-white. ○ 24% of participants identified as Hispanic.

City/Date	Location	Summary of Results
Lawrence 9/14/22	**Location 1:** Commuter Rail station **Location 2:** America's Food Basket	○ 49 unique survey participants who were heavily reliant on transit buses and private vehicles for their selected transportation modes. ○ 53% of participants were female. ○ 41% were between the ages of 45 to 64. ○ 51% of participants self-identified as non-white. ○ 78% of participants identified as Hispanic.
Lynn 9/9/22	**Location 1:** Commuter rail station/Farmer's Market **Location 2:** Bus Station (busier than the community rail station) **Location 3:** Fresh Market	○ 83 unique survey participants who were heavily reliant on transit buses and subways for their selected transportation modes. ○ 58% of participants were female. ○ 28% were between the ages of 22 to 34. ○ 51% of participants self-identified as non-white. ○ 59% of participants identified as Hispanic.
Lowell 9/12/22	**Location 1:** Bus & Commuter rail station **Location 2:** Market Basket	○ 52 unique survey participants who were heavily reliant on transit buses and subways for their selected transportation modes. ○ 50% of participants were female. ○ 35% were between the ages of 45 to 64. ○ 65% of participants self-identified as non-white. ○ 40% of participants identified as Hispanic.
Springfield 9/21/22	**Location 1:** Union Station **Location 2:** Downtown Springfield—Main St.	○ 124 unique survey participants who were heavily reliant on transit buses and private vehicles for their selected transportation modes. ○ 61% of participants were male. ○ 17% were between the ages of 35 to 44. ○ 50% of participants self-identified as non-white. ○ 58% identified as Hispanic
Pittsfield 8/16/22	**Location 1:** "Third Thursday" event in downtown Pittsfield	○ 69 unique survey participants who were heavily reliant on private vehicles for their selected transportation modes. ○ 59% of participants were female. ○ 33% were between the ages of 22 to 34. ○ 32% of participants self-identified as non-white. ○ 9% of participants identified as Hispanic.

Figure 4.3 summarizes the number of survey responses by location.

Figure 4.3 Survey Responses by Community Activation Location



4.3 Public Meeting

As part of the planning process, a virtual public meeting for *Beyond Mobility* was hosted on October 20, 2022 from 6:00 p.m. to 8:00 p.m. At this meeting, MassDOT introduced the *Beyond Mobility* planning process, information related to trends affecting transportation in the future, and summary results from the first public survey.

Virtual Public Meeting by the Numbers

- 67 participants out of 129 registrations
- 3 live interpreters
- 11 percent of participants "rarely engage in transportation or community plans"

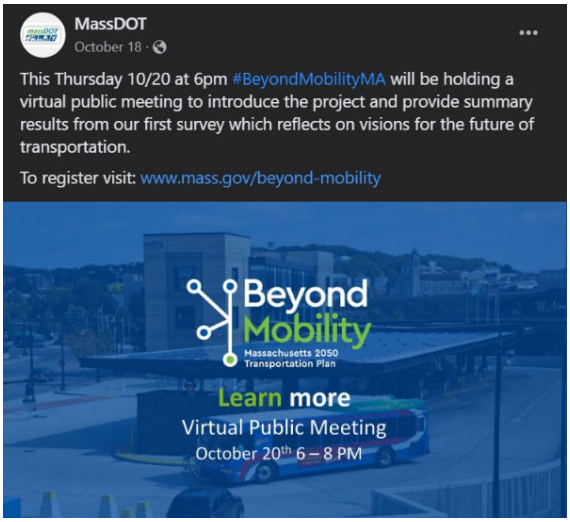
This virtual meeting was conducted using the Zoom platform, and the general public was invited to participate through multiple digital communication methods. Spanish, Portuguese, and Chinese interpreters were provided. The purpose of the public meeting was to share information and seek input related to priorities and vision for the Commonwealth's transportation system. In addition to providing input, the public meeting provided an opportunity for questions from the general public to be answered by MassDOT.

Marketing

A variety of marketing tactics were used to inform residents of the Fall 2022 *Beyond Mobility* virtual public meeting, including media advisories, website materials, flyers, social media, and email outreach. Multilingual flyers and media advisories were prepared in the following languages:

- Haitian Creole
- Arabic
- Chinese (Simplified & Traditional)
- French
- Portuguese
- Spanish
- Vietnamese

Figure 4.4 Social Media Post on Facebook


MassDOT
October 18 ·
This Thursday 10/20 at 6pm #BeyondMobilityMA will be holding a virtual public meeting to introduce the project and provide summary results from our first survey which reflects on visions for the future of transportation.
To register visit: www.mass.gov/beyond-mobility
Beyond Mobility
Massachusetts 2050 Transportation Plan
Learn more
Virtual Public Meeting
October 20th 6 – 8 PM

Public meeting notices were provided to all members of the *Beyond Mobility* project email distribution list. Social media was used to promote the public event, including multiple posts on Twitter, Instagram and Facebook.

Overview

The public meeting began with a presentation with real-time polling questions for attendees to provide their thoughts through their phones or computers. The presentation agenda included the following topics:

- **Why Plan for 30 Years from Now?** The Purpose for a Statewide Long Range Plan Vision.
- **What Are We Hearing?** Insights from Ongoing Community Conversations.
- **What Will Impact the Way We Get Around in the Future?** Trends Impacting the Way Residents, Visitors and Freight will Move.
- **How Can You Stay Engaged?** Keep the Conversation going and Help Shape the Future of Transportation in the State.
- **Questions & Answers.** Massachusetts is Going Places—and Getting There Begins with You.

The public meeting concluded with the question and answer session.

Why Plan for 30 Years from Now?

The presentation provided an overview of the purpose of *Beyond Mobility*, the desired outcomes, the planning process, and supporting plans and policies.

Attendees learned that the purpose of *Beyond Mobility* is to **articulate a vision** that will guide the future of transportation in Massachusetts. The plan provides direction for **the future of MassDOT** and its role in shaping the Commonwealth's transportation future. It will serve as a strategic plan for MassDOT and **inform future modal plans** that focus on bicycle and pedestrian transportation, transit, freight, pavement and bridges, airports, and ports. It also guides future capital planning, which covers **how *Beyond Mobility* directs investment of MassDOT funding** to different priorities using limited resources.

What Are We Hearing?

Attendees learned about MassDOT's public engagement in the *Beyond Mobility* planning process, such as who is being heard and what is being learned. The presentation focused on identified priorities and challenges.

Connectivity and reliability were recurring themes. Participants expressed that transportation barriers limit access to jobs, services, and other cultural activities and communities; transportation should provide greater options in terms of how people move; reliable travel times and safely connecting people to the places they want to go are the top priorities; improvements are desired in connectivity, reliability, efficiency, and the user experience of the transportation system; and that many participants placed a high value on convenience and affordability.

What Will Impact the Way We Get Around in the Future?

MassDOT provided an overview of the trends that will impact the way residents get around today and in the future. *Beyond Mobility* reflects a range of potential futures possible in Massachusetts. The five categories of trends include Climate Crisis, Future of Work, People and Places, Prosperity, and Technology.

The presentation summarized the impacts of the **climate crisis** expected between 2022 and 2050 in Massachusetts, such as heatwaves, extreme weather, and infrastructure failures. The *Beyond Mobility* planning process will account for climate change trends and ensure alignment with targets and goals that are part of the Massachusetts Executive Office of Energy & Environmental Affairs' Clean Energy and Climate Plan for 2025 and 2030. This Plan notes that transportation is the largest source of greenhouse gas (GHG) emissions in the Commonwealth, responsible for 42 percent of statewide GHG emissions as of 2019.

Attendees were provided an overview of how habits and patterns for the **future of work** might impact transportation. The flexible time and remote work that existed during the COVID-19 pandemic has come to be expected by many Massachusetts workers in many industries. At the same time, benefits may not be distributed fairly; white-collar employees enjoy benefits that essential workers do not, presenting equity problems. MassDOT shared that the *Beyond Mobility* vision statements will

take into account how telework trends could look in the future and how our long range strategies match those potential realities.

Participants learned about the trends impacting the **people and places** across the Commonwealth. Overall, young people arriving from other countries have outnumbered the total out-migration from Massachusetts in the past decade, creating a young, diverse population in Massachusetts. However, these migration trends do not impact each region equally. Regions such as the Berkshires and Cape Cod have an aging population and may need medical, social, and transportation services more than other regions. MassDOT shared that future growth patterns are unclear, but important to consider, and coordinating housing and transportation is critical to achieving many goals.

The presentation addressed **prosperity**, noting the large racial wealth gap in Massachusetts and noted that residents of Gateway Cities pay nearly double the recommended 15 percent of their income on transportation. MassDOT shared that *Beyond Mobility* will intentionally prioritize equity and how transportation can help to make the Commonwealth more affordable in all its regions.

MassDOT shared key **technology** trends that could impact transportation by 2050, such as vehicle automation and electrification. As the Commonwealth works toward electrification and more electric vehicles on our roadways, renewable energy sources will be critical to develop.

How Can You Stay Engaged?

Attendees were provided several ways to continue to engage with the *Beyond Mobility* planning process, including:

- Hosting MassDOT speakers to share information at attendees' groups or organizations.
- Signing up to join the email list to stay up to date on the planning process.
- Following MassDOT on social media to get updates on more engagement opportunities and to follow along as conversations continue across the community.

Questions and Answers

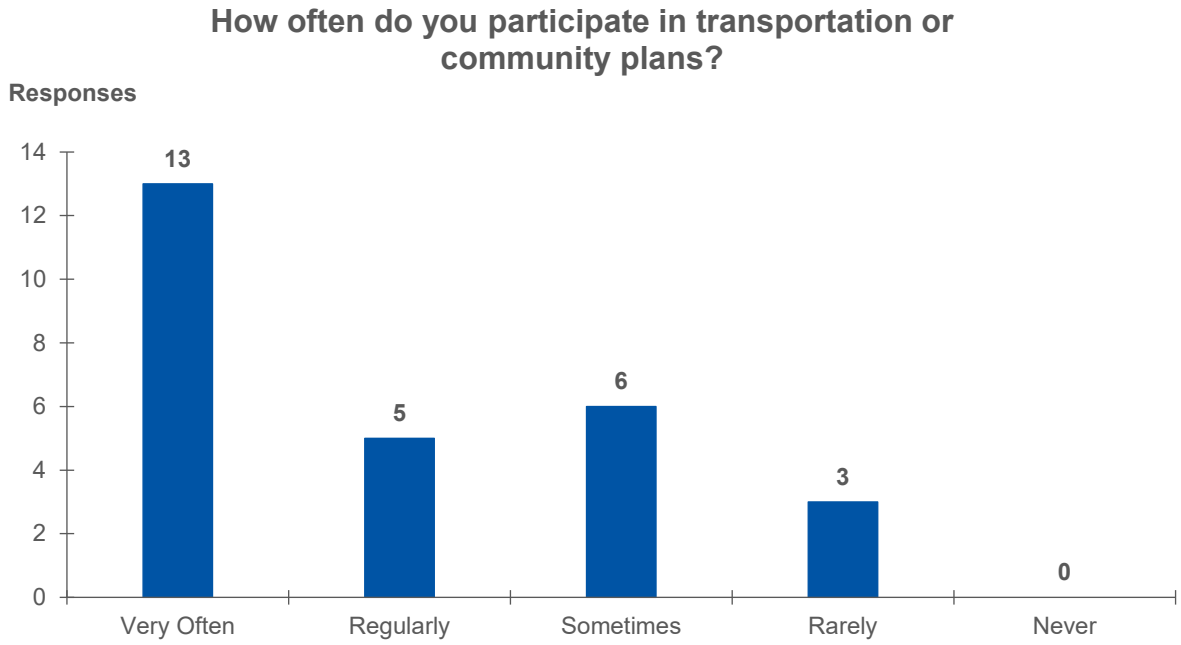
The final portion of the public meeting was dedicated to questions and comments from attendees. Attendees were able to ask questions verbally or by typing using the "Q&A" box and received responds to each question from MassDOT. Attendees were asked to complete a brief survey after exiting the meeting to provide feedback on their experience during the public meeting.

Real-Time Polling Questions

Approximately half of the attendees participated in the real-time polling throughout the presentation. Below is a summary of the responses to each of the polling questions.

In the first poll, 18 of 27 respondents indicated that they participate in transportation or community planning processes very regularly or very often.

Figure 4.5 Public Meeting Question 1



There were 32 open-ended responses for features of a great transportation system (Figure 4.6). Some of the most common responses included walkability, reliability, affordability, and frequency.

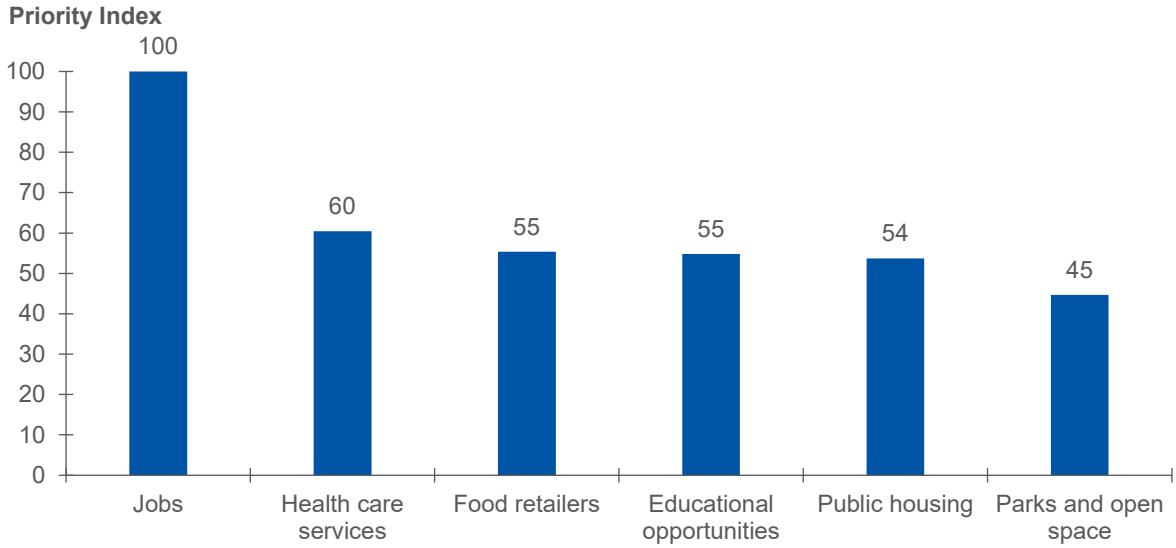
Figure 4.6 Features of a Great Transportation System

There were 31 open-ended responses to the ideal future transportation system in Massachusetts (Figure 4.7). The most common responses included equitable, affordable, reliable, accessible, and convenient.

Figure 4.7 Ideal Future Transportation System

There were 33 responses to where the most important connections should be (Figure 4.8). The top-ranked connection was jobs, followed by health care service.

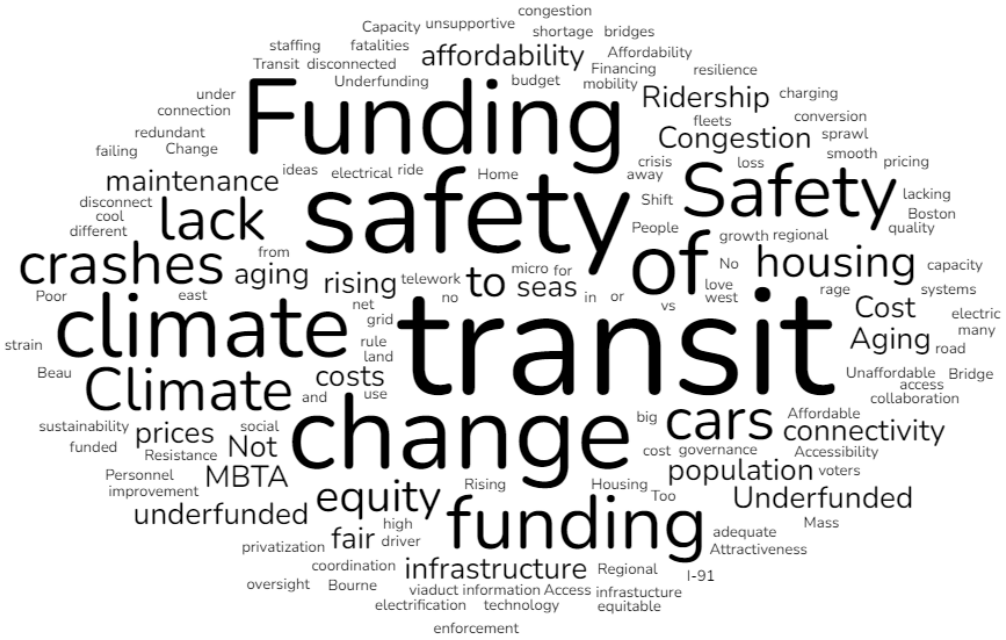
Figure 4.8 Most Important Transportation Connections



Note: Calculated using the Borda Count method and indexed to 100.

There were 31 open-ended responses to the largest challenges (Figure 4.9). The challenges most frequently cited included funding, safety, climate change, and underfunded transit.

Figure 4.9 Largest Challenges Facing Transportation



There were 27 open-ended responses to which future trends will have the largest impact (Figure 4.10). The top trends reported include climate change, technology, telework, and population growth.

Figure 4.10 Trends with the Largest Impact

Event Evaluation

There were 27 anonymous respondents who completed the event evaluation survey. Over half of the respondents (52 percent) heard about the meeting through social media or the MassDOT website. Others reported finding out about the meeting through MPOs/RPAs/RTAs or nonprofit/community-based groups. There were a few respondents who heard about the meeting through family and friends. The respondents that saw the *Beyond Mobility* project flyer (52 percent) felt it was helpful in giving information about the meeting.

All respondents felt that instructions provided during the meeting were helpful. Two respondents noted that they requested accommodations, and both were addressed. Respondents felt that purpose and intent of the meeting were clearly explained; 85 percent of the respondents felt that it was clearly explained, while the other 15 percent felt that it was somewhat clear.

In terms of the quality and clarity of the information provided during the virtual public meeting, 52 percent of respondents felt that the information exceeded expectations and 44 percent felt that it met expectations. Four percent of the respondents felt that some improvements were needed with the information. Overall, respondents noted they were able to use the tools provided using the Zoom platform. Around 96 percent of the respondents were able to use the tools provided, while 4 percent were not able.

4.4 Focus Groups and Interviews

Focus groups and interviews targeting traditionally hard-to-reach communities were held in March 2022 as part of public engagement for *Beyond Mobility*. Recruitment for all groups and interviews relied on both a database of existing relationships and a network of partner community-based organizations. Recruitment was focused on targeted communities across the state. Potential participants completed a screening questionnaire to confirm eligibility, and participants completed a pre-discussion survey ahead of discussions. Finally, groups participated in a focus group or one-on-one interview.

Pre-discussion survey questions were coded and summarized using frequency tables, and interview and focus group recordings were transcribed and coded based on themes and subthemes using NVIVO software tools.[2]

Demographic Characteristics

A total of 40 participants were included across six study groups. Participants ranged from 21 to 72 years of age. Only 10 percent of participants earned more than $152,000 per year. Participants came from diverse geographic areas of Massachusetts representing 25 unique zip codes. Communities included Boston, East Boston, Framingham, Brockton, Worcester, Shrewsbury, Randolph, Roxbury, Mattapan, Dorchester, Springfield, Hyde Park, Watertown, Waltham, Somerville, Gardner, Revere, Amherst, Fall River, Everett, Malden, Cotuit, Chicopee, Holyoke, Stoughton, Plainville, and Lawrence.

[2] NVIVO is a software program used for qualitative and mixed-methods research.

Table 4.3 Focus Group and Interview Participants

Focus Group	Number (%)
English-speaking Black community	7 (17.5%)
Spanish speaking	7 (17.5%)
Mandarin speaking	3 (7.5%)
Vietnamese speaking	3 (7.5%)
Haitian creole speaking	11 (27.5%)
Portuguese speaking	9 (22.5%)
Total	**40 (100%)**

Findings and Results

Both the pre-discussion survey and discussion questions were aimed at better understanding existing conditions (e.g., modes of transportation drivers of transportation choices), barriers, and the future vision of transportation in Massachusetts.

Modes of Transportation

When asked about modes of transportation, participants were able to select more than one response. More than half of all respondents (56 percent) reported driving a private vehicle, and almost half of respondents reported riding the bus (44 percent) or walking (42 percent). More than one-third of respondents (36 percent) reported riding the subway, with an additional 31 percent reporting using a shared vehicle (e.g., taxi, Uber, Lyft).

Overall, two-thirds (67 percent) of comments about the Massachusetts transportation system were negative and 33 percent were positive.

When discussing public transportation, participants were motivated by the convenience and relatively lower cost of public transportation versus other methods. However, participants also felt that public transportation was less reliable than other modes of transportation, lacked sufficient connectivity and coverage in areas outside of Boston, and was less safe than other modes of transportation.

When discussing personal vehicle usage, participants felt that there was more connectivity, coverage, and reliability than using public transportation. Transit connectivity and coverage are seen as particularly problematic in the suburbs, where participants viewed vehicles as essential for mobility. However, personal vehicles were also seen as more expensive and less convenient than other modes of transportation in part due to traffic and limited parking.

Shared vehicles such as taxis, Uber, or Lyft were described as safer and more reliable than public transportation but also more expensive than other modes of transportation.

Walking was perceived as affordable but was limited by the distance to the destination, weather conditions, and insufficient sidewalks for pedestrian safety.

Participants did not commonly discuss bicycling. The few references to bicycling discussed the lack of bicycle infrastructure, including insufficient bicycle lanes and the need to improve bicycle lane quality.

Impact of Identity and Culture

Participants felt identity and culture influenced transportation choices across three key areas:

1. Low-income households that live closer to the urban core rely more heavily on public transport due to the lack of affordability of a personal vehicle.

2. Immigrants may be unable to obtain a driver's license. This leads to reliance on a personal vehicle or simply lacking transportation due to limited connectivity and coverage in certain areas.

3. Immigrants or those with diverse cultural experiences may have cultural habits about the transportation system. For example, participants from China often discussed their high-efficiency public transportation system. Participants from Brazil discussed the fact that they more commonly walked before coming to the US.

Impact of COVID-19 Pandemic

When asked, "Have any of the following changes caused you to adjust the way you travel?" participants could select more than one response. Eighty-six percent of participants (31 people) reported that they changed their travel habits due to a cause highly correlated with the COVID-19 pandemic. In qualitative focus groups and interviews, participants reported less public transportation usage due to the need for social distancing and lack of sufficient space in buses, subways, and trains. Mandarin-speaking and Vietnamese-speaking participants also commented on the rise of anti-Asian hate crimes, which has led to less perceived safety and avoidance of using public transportation.

Barriers/Challenges

Participants described dangerous path conditions including potholes on the roads, aggressive driving habits, and the lack of sufficient sidewalks and bike paths. The geographic locations of these challenges are throughout the state, including downtown areas, highways, and suburbs. Participants also perceived public transit to lack sufficient security from potentially harmful individuals.

Adequate public transportation is perceived as an essential means of transportation for predominantly Black, low-income, and/or communities living in inner-city neighborhoods where personal vehicle ownership is less common. Public transportation is perceived as necessary for individuals living with a disability. While some participants felt that buses were "great" for individuals living with a disability, others felt there was room for improvement, particularly in terms of train accessibility as not every train is accessible. Language and driver's license requirements are also seen as making some groups more reliant on public transportation than others.

Public transportation is not generally perceived as a reliable mode of transportation due to limited operating hours and frequent delays.

Connectivity and coverage of public transportation are seen as inadequate in areas outside of Boston, impacting individuals requiring regular access to Boston for work.

Overall, participants relied on public transportation as a more affordable mode of transportation. Spanish-speaking participants were most likely to cite cost issues related to public transportation.

Future Vision

Participants felt positive about the existence of public transit, in general, including the commuter rail, bus network, and subway. Notably, participants wanted to see the public transit system expanded and modernized. Participants also felt positive about programs aimed at making public transit more affordable (e.g., reduced fare programs) and wanted to keep these programs in the future. Other aspects of the Massachusetts transportation system that participants wanted to keep included the CharlieCard, multimodal station accessibility, time estimates of transport arrival, and the taxi system.

Maintaining and improving the condition and reliability of the transportation system was most frequently ranked “most important” (47 percent). Modernization and expansion were each ranked as most important at approximately equivalent rates (28 percent and 25 percent, respectively). Transit infrastructure was considered the most important to maintain (with a mean score of 2.1, in which lower scores equal higher importance) followed closely by roadway pavement (2.2) and sidewalks (2.8).

In qualitative responses, participants most commonly discussed the need for improved infrastructure (including connectivity and coverage), modernization, improved reliability of the existing transportation system, affordability, and safety as the top five goals for the future Massachusetts transportation system.

Key Needs and Concerns

The top five areas for improvement within Massachusetts transportation system based on thematic analysis of the pre-discussion survey and qualitative focus groups and interviews include:

1. **Improve reliability:** Operating hours of public transit should expand to later in the evening with more operating hours on the weekends. This is particularly true in areas outside of Boston. More efforts are needed to ensure public transit adheres to timetables with better communication when updates and changes are made.

2. **Improve maintenance:** There is a need to fix potholes to make driving safer for those that rely on personal vehicles for commuting. More regular cleaning and maintenance of vehicles (e.g., buses, trains, subways).

3. **Expand infrastructure:** There is a need to expand access to public transportation including commuter rail, trains, and buses in areas outside of Boston. Currently, there is insufficient connectivity and coverage in areas outside of downtown Boston. Within Boston, there is a need for more sidewalks.

4. **Maintain affordability**: Affordability is a key driver of how certain groups (e.g., low-income, Spanish-speaking, immigrant, inner-city) use the transportation system. Participants felt it is important to maintain affordability by minimizing fare increases and continuing reduced fare programs.

5. **Improve security:** There is a desire to make public transit stations more secure, especially for communities that are the target of race or gender-based violence. Suggested improvements include more security cameras and on-site personnel.

4.5 Web-Based Surveys

Beyond Mobility Phase I Vision, Values, & Needs Survey

The *Beyond Mobility* Phase I Vision, Values, & Needs Survey was distributed in Summer 2022 via emails, social media, paid media, and stakeholder group networks. The survey collected 1,107 unique responses.

Demographic Characteristics

Responses to the survey were mostly English, with five surveys completed in a foreign language. Responses came from a wide range of zip codes (over half of the active zip codes in the Commonwealth), with a majority from urban or suburban zip codes; only 3.25 percent of respondents reported living in rural zip codes.

Demographic characteristics of the respondents were compared to statewide demographics to better understand which populations may have been under- or over-represented in the results. Among respondents, that largest equity group was older people aged 65 and above (13 percent) and people of color (11 percent). At the same time, there was slight over-representation of working-age people (ages 22 to 64) compared to statewide numbers, and a related slight under-representation of people aged 65 and over and significant underrepresentation of people under age 18 (only one percent of respondents). There was also over-representation of white respondents compared to the statewide population. People of color and the Hispanic population were underrepresented.

Overall, household incomes among respondents were higher than the statewide median. Household income among survey respondents was about $100,000 compared with the state median of $84,000. Only 60 responses (5.4 percent) were from individuals in households earning less than $29,000 a year.

Findings and Results

Across all question types, results were analyzed for all respondents as a group as well as responses of four distinct equity groups: rural residents; people of color; low-income households; and people aged 65 and older. This was an effort to better understand and contextualize the needs of specific groups in the Commonwealth.

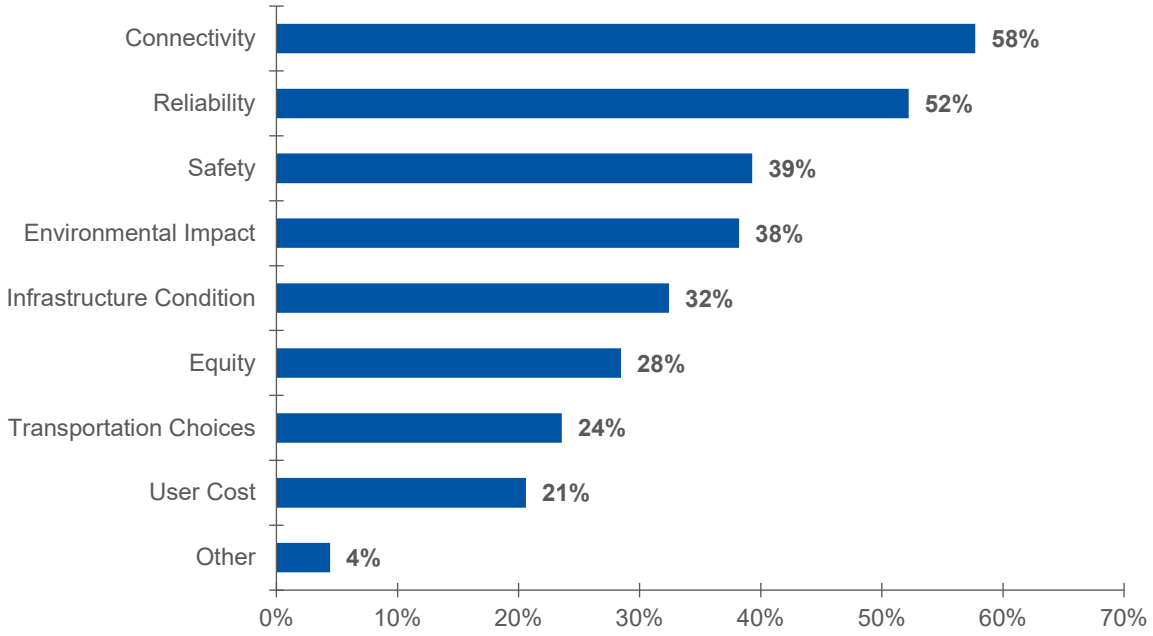
Open-ended questions were analyzed through development of a detailed "code book," by which response types were coded and quantified. Open-ended questions asked respondents to identify core functions of a transportation system and their priorities for the system in the future. Key findings were as follows:

- Respondents indicated an interest in core functions of a transportation system: connectivity, reliability, efficiency, and user experience. Affordability and safety were also priorities across groups.
- Rural respondents differ in priorities, valuing system expansion, efficiency, and transit accessibility more than other equity groups.
- Fewer responses highlighted flexibility, state of good repair, resilience, intelligent transport, unimposing (minimum inconvenience to non-users), and supportive land uses.
- Respondents recognize that transportation is a pathway to opportunity (e.g., access to jobs, services, and other cultures and communities). By providing options of how they move, it improves their quality of life and the quality of the places around them.

Multiple choice questions asked respondents to identify elements they would like to see improved or changed in the transportation system and to rank certain types of improvements. Key findings were as follows:

When asked what they would like to see improved or changed, respondents emphasized connectivity, reliability, and safety (Figure 4.11).

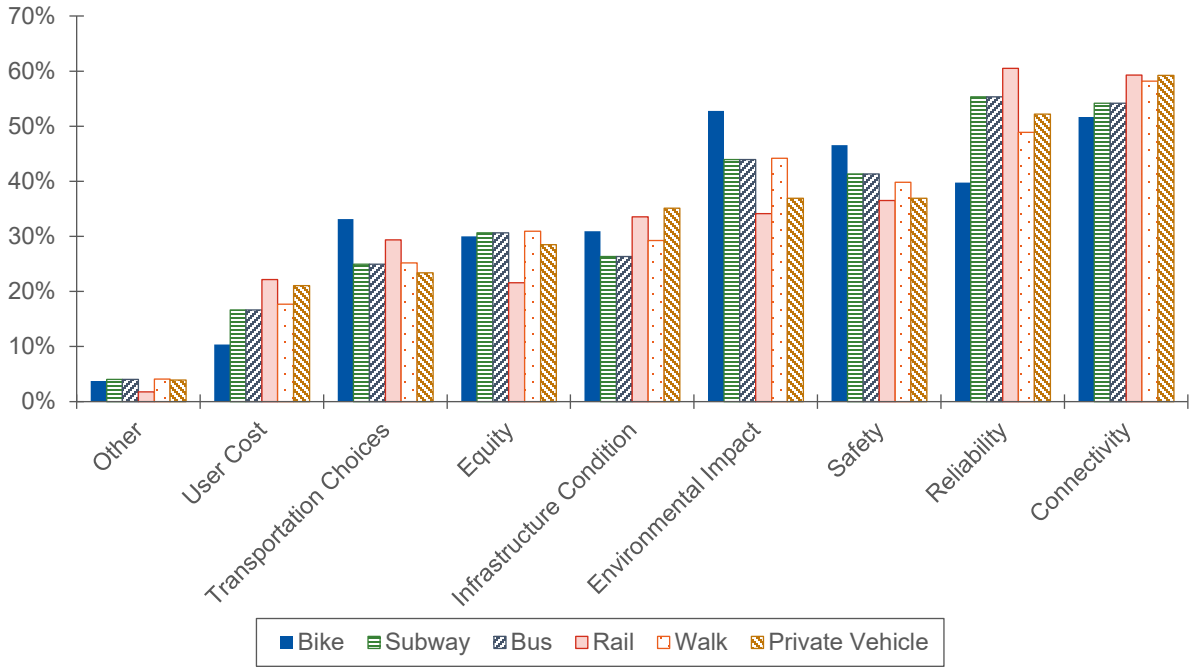
Figure 4.11 "What aspects would you like to see improved or changed?"



Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

Rail and private vehicle users were the most likely to rank connectivity highly (Figure 4.12). Subway, bus, and rail users were among those who ranked reliability most highly. Safety ranked highly among people who reported bicycling.

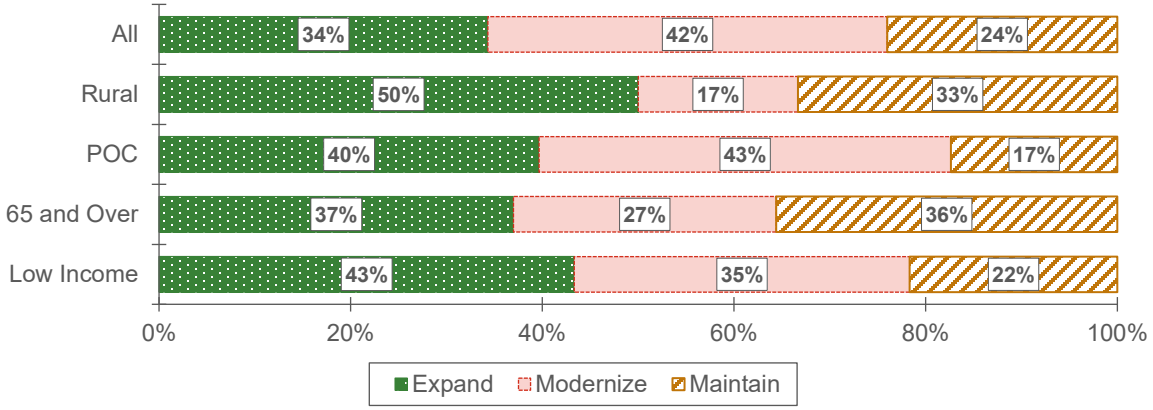
Figure 4.12 "What aspects would you like to see improved or changed?"



Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

When asked to rank components of the transportation system they found most important, responses between equity groups and the general population differed (Figure 4.13). Rural, low-income, and older respondents emphasized expansion, while respondents of color most valued modernization. Maintenance was ranked most highly among rural and older respondents.

Figure 4.13 "Which qualities are most important to you?"



Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

Beyond Mobility Phase II Priorities & Tradeoffs Survey

The *Beyond Mobility* Phase II Priorities & Tradeoffs Survey was distributed in Fall 2022 via community activations, emails, social media, and stakeholder group networks. The survey collected 2,542 unique responses.

Demographic Characteristics

Community activations and providing incentives allowed the Phase II survey to reach more people from different equity groups. Ultimately, these efforts succeeded in capturing far more diverse perspectives when compared to the Phase I survey. Nearly half (47 percent) of those surveyed were part of at least one equity group. In part, this was because the *Beyond Mobility* Phase II Priorities & Tradeoffs Survey offered a more nuanced understanding of equity, asking respondents for their disability status. The portion of people reporting disability roughly matched the overall state percent of the disabled population.

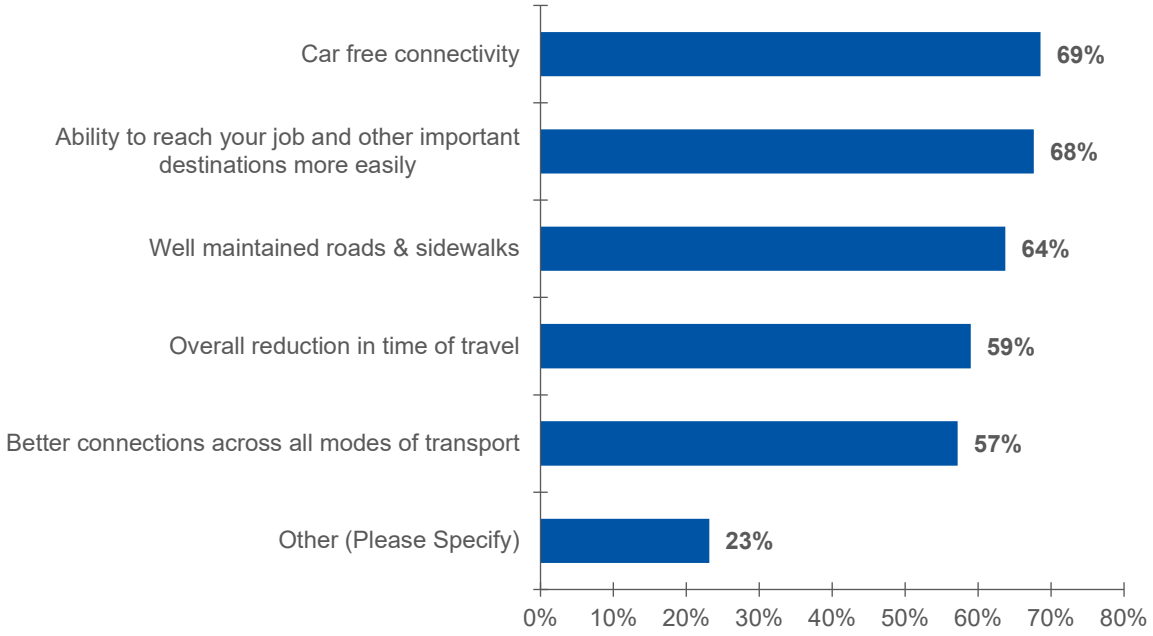
In all, differences in demographics compared to Phase I included:

- Phase II respondents reported biking, walking, and using private vehicles less frequently, while more Phase II respondents reported riding the bus.
- There were more people of color, non-English speaking, low-income respondents in Phase II than Phase I, while there were fewer older and rural respondents.
- There were more respondents from zip codes in urban centers like Boston, Worcester, Lawrence, and Springfield.
- While Phase I median income was about $100,000 per year, Phase II median income was $83,000 per year, which is below the statewide median income of $84,400.
- 88 percent of responses were in English in Phase II, compared to 99.5 percent in Phase I. 10 percent (253) of surveys were completed in Spanish, with 1.3 percent (32) completed in Haitian Creole and 0.6 percent (14) completed in Portuguese. There were also French, Arabic, and Chinese responses.

Findings and Results

When asked to identify key features of a great transportation system, 69 percent of respondents highlighted car-free connectivity (Figure 4.14). This feature was identified most readily among respondents who bike, walk, or ride the subway, but was also the top choice among the group as a whole. Similarly, 68 percent selected the ability to reach important destinations.

Figure 4.14 What does a great transportation system offer?



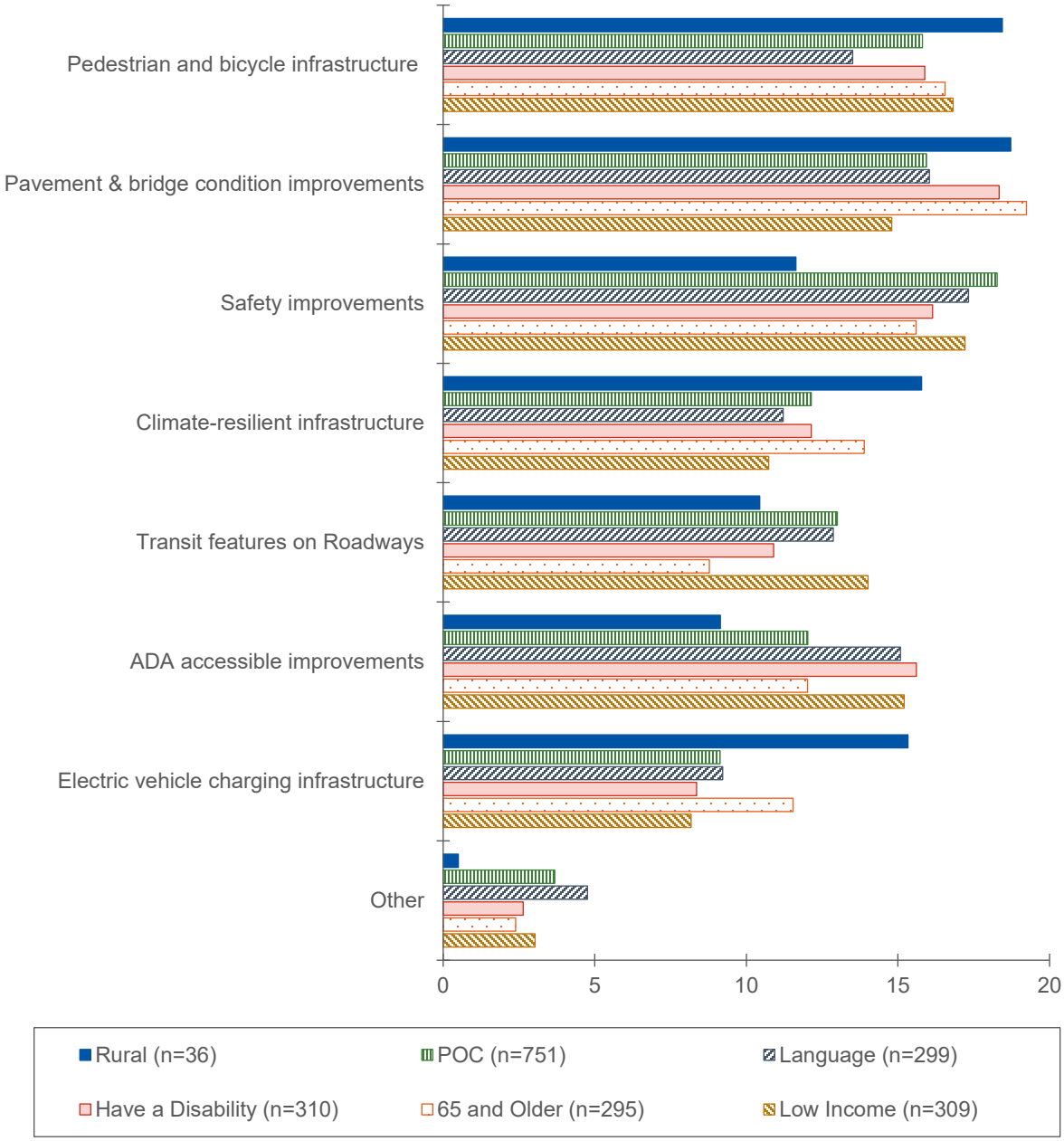
Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

When asked to allocate "tokens" across reestablished sets of roadway improvements, responses differed across equity groups (Figure 4.15).

Pedestrian and bicycle infrastructure received the most selections among survey respondents overall. Among equity populations, rural, low-income, and older respondents prioritized bicycle and pedestrian infrastructure the most. Pavement and bridge condition was the second highest category for allocated tokens, with older and rural respondents again prioritizing this over other groups.

Across all categories but rural respondents, electric vehicle charging infrastructure was the category with the fewest overall allocated tokens. For rural respondents, ADA accessible improvements received the fewest tokens overall.

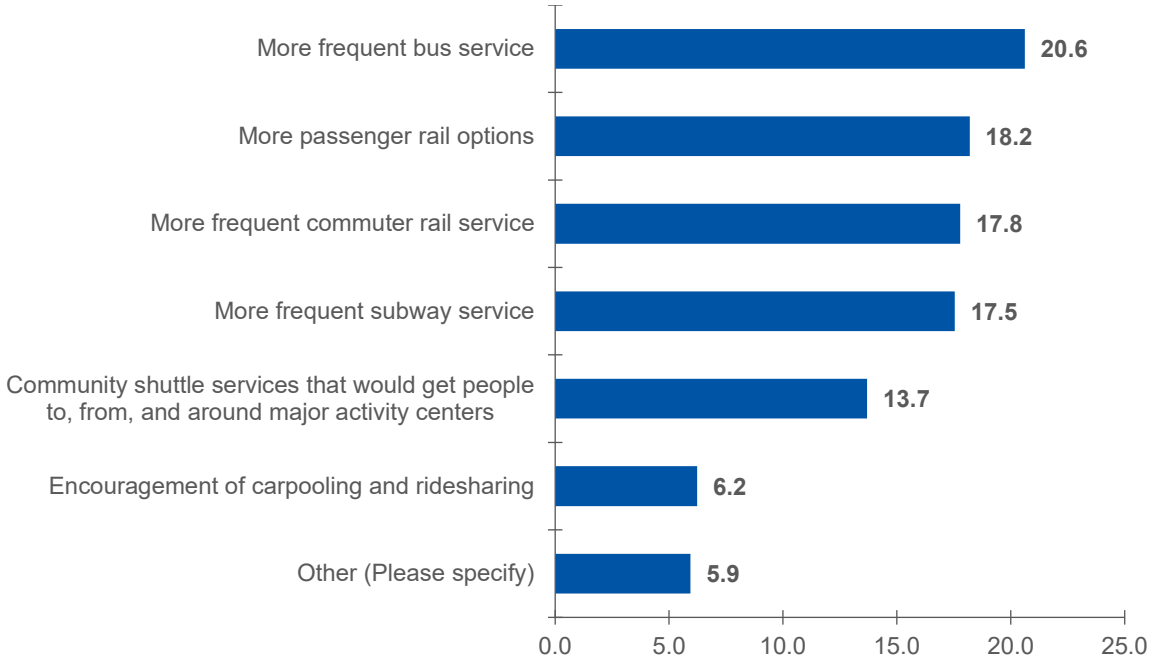
Figure 4.15 Token Allocation by Equity Group



Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

When asked to allocate tokens among transit-related topics, respondents chose frequency of bus and commuter rail service, as well as passenger rail options, as their top three priorities (Figure 4.16). Among equity groups, low-income, disabled, and non-English speaking household prioritized more frequent bus service. Of those selecting more passenger rail options, rural residents were the group to allocate the most tokens by far.

Figure 4.16 Token Allocation Across Transit Improvements



Source: Beyond Mobility Phase II Priorities & Tradeoffs Survey, Fall 2022.

4.6 Stakeholder Interviews and Advisory Committee Meetings

External stakeholders representing transportation, equity, business, and environmental interests assisted with the development of *Beyond Mobility's* Priority Areas, vision statements, Problem Statements, and Action Items. This group of stakeholders was engaged through interviews and small group sessions.

An advisory committee called the Implementation Group (IG), comprised of individuals with roles or fields that represent subject matter experts within MassDOT and MBTA, was convened. The IG guided proposed strategies, policies, and performance measures and helped develop the *Beyond Mobility* Priority Areas, vision statements, Problem Statements, and Action Items.

The list below summarizes the organizations and MassDOT divisions involved in the IG:

- MassDOT Highway Division
- MassDOT Aeronautics Division
- MassDOT Office of Performance Management and Innovation (OPMI)
- MassDOT Rail & Transit Division
- MassDOT Secretary's Office
- Massachusetts Bay Transit Authority (MBTA)
- MassDOT Registry of Motor Vehicles (RMV)

4.7 Online Presence and Marketing

Beyond Mobility's online presence was established through a website, social media posts, and virtual public engagement. A variety of marketing tactics informed and educated residents about the planning process. Based on the type of message and the target market, multilingual communication strategies were developed for traditional and digital marketing.

Website

The website was the primary forum for communicating project updates. Throughout the process, the website provided information on public meetings, links to surveys, and multilingual content translated into Haitian Creole, Arabic, Chinese (Simplified & Traditional), French, Portuguese, Spanish, Vietnamese through the UMass Translation Center and/or the Statewide Language Services Contract.

Social Media

Social media outreach was designed to bolster public engagement throughout the process. In coordination with MassDOT Communications, social media outreach for *Beyond Mobility* served as a key channel for announcements, key findings, and general information across platforms.

Traditional Media Activities

Both earned and paid media efforts were part of the strategy with local radio (online and digital) and newspaper partners in underserved communities. Tactics included interviews, paid radio and newspaper ads, community flyer distribution, bodega signs, media advisories, and press releases.

Earned media refers to material produced for public consumption about *Beyond Mobility* that was not produced by MassDOT. This could include radio spots, news articles, or television coverage. *Beyond Mobility* had nine instances of earned media over the course of the plan, including one television (LynnTV), one radio (NPR), and seven online news media stories.

Paid media refers to material produced by MassDOT about *Beyond Mobility* for public consumption. This included 24 advertisements distributed in various formats via radio, Facebook, print newspapers, and online news outlets. This paid media was targeted towards media outlets catering to specific ethnic groups. In total, the paid media amounted to a potential for 7,135,671 people reached. Most of these paid media placements were not equipped to measure subsequent engagement (e.g., listeners or viewers). Of those four placements that did measure engagement, they logged 1,510 total clicks.

Email Campaign

Beyond Mobility included an email campaign to reach out to stakeholders, advisory committee members, and interested members of the public. Messaging focused on keeping recipients well-informed of all activities, including upcoming public meetings and events, survey availability for public participation, new findings, and the release of the draft plan.

Registry of Motor Vehicles and Outdoor Advertising

To further help promote awareness and participation in all outreach engagements, MassDOT utilized MassDOT-owned assets to promote engagement opportunities. *Beyond Mobility* engagement opportunities were advertised in waiting areas of Registry of Motor Vehicles facilities across the state. Outdoor signage was also used to promote survey opportunities in collaboration of the Highway Division and the MBTA.

Thank you

July 2024

Beyond Mobility

Massachusetts 2050 Transportation Plan

Appendix B: Previous Plan Review

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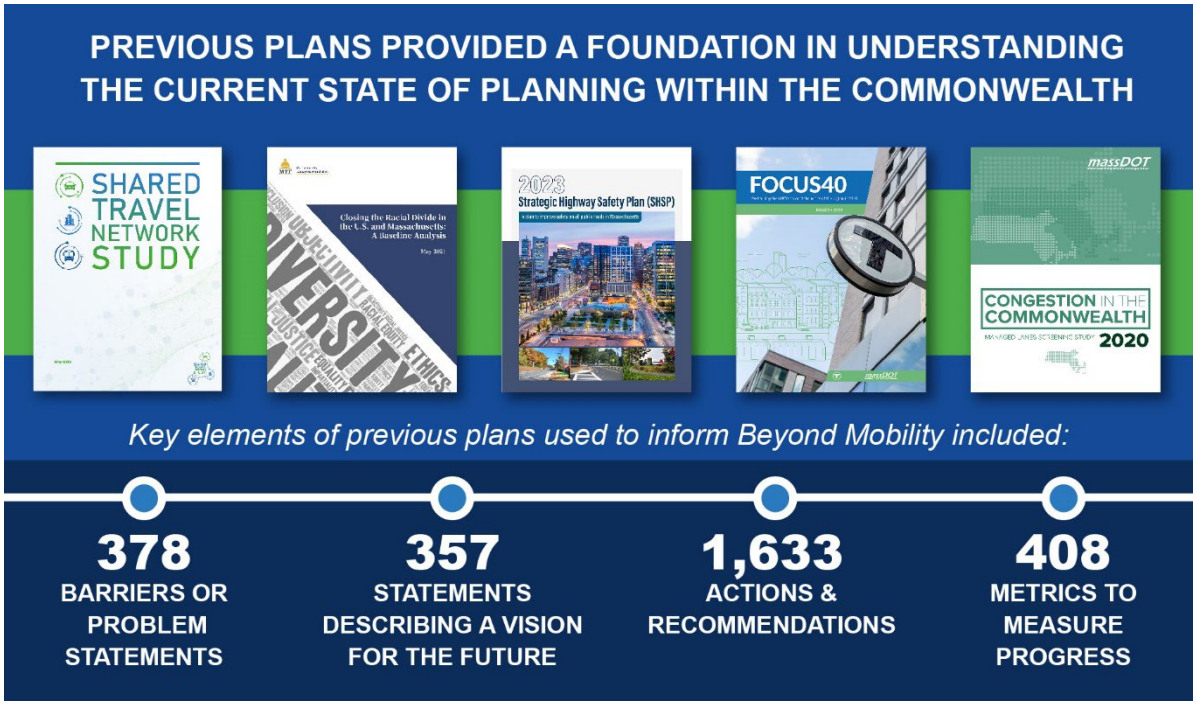
1.0 Previous Plan Review

Previously adopted plans provided the foundation of *Beyond Mobility*. Inventorying existing plans provided an opportunity to identify common visions, needs, recommendations and performance measures and examine any gaps between existing MassDOT plans, policies, and programs and the *Beyond Mobility* vision for transportation. In order to better understand the current state of planning within the Commonwealth, MassDOT developed an inventory of plans, policies, and directives in the state ("Plan Inventory"), as demonstrated in Figure 1.1. The Plan Inventory represents planning efforts across Massachusetts at the local, regional, and statewide levels.

Figure 1.1 Key Elements of Previous Plan Review


PREVIOUS PLANS PROVIDED A FOUNDATION IN UNDERSTANDING THE CURRENT STATE OF PLANNING WITHIN THE COMMONWEALTH
SHARED TRAVEL NETWORK STUDY
Closing the Racial Divide in the U.S. and Massachusetts: A Baseline Analysis
2023 Strategic Highway Safety Plan (SHSP)
FOCUS40
massDOT
CONGESTION IN THE COMMONWEALTH
2020
Key elements of previous plans used to inform Beyond Mobility included:
378
BARRIERS OR PROBLEM STATEMENTS
357
STATEMENTS DESCRIBING A VISION FOR THE FUTURE
1,633
ACTIONS & RECOMMENDATIONS
408
METRICS TO MEASURE PROGRESS

Source: Beyond Mobility Previous Plan Inventory, 2023.

Previous plans informed the understanding of the key phases of the *Beyond Mobility* planning process. In total, 90 plans were reviewed, ranging from modal plans to high-level policy documents. Key information for the following categories was collected from each plan:

- **Barrier & Problem Statements:** Plans identified a range of problems, from site-specific issues (e.g., roadway bottlenecks) to broad issues (e.g., housing affordability).
- **Visions:** Plans identified visioning content by many different names, including terms such as "guiding principle" or "values." In several plans that lacked a clear vision statement, objectives or goals were included.

- **Actions:** Plans differed in how they referred to and structured actions or recommendations. In some plans, "tactics" and "strategies" fulfilled a role as actions. Actions vary across types (capital programming, policy and program, performance and planning, organizational, or partnership and engagement).

- **Performance Measures:** Many plans also established performance measures or metrics to measure progress towards goals. These measures were identified according to performance goal category as well as performance targets, if applicable.

Previous plans provided the foundation for several tasks of *Beyond Mobility*, including defining the Priority Area vision statements, understanding problems and barriers, measuring performance, and developing Action Items.

Table 1.1 provides an overview of the previous plans reviewed as part of the *Beyond Mobility* previous plan inventory.

Table 1.1 Previous Plans Reviewed

No.	Plan, Policy, Directive Name	Year	Sponsor/ Author(s)	Geography Covered
1	Massachusetts Freight Plan	2018	MassDOT	Massachusetts
2	Massachusetts Bicycle Transportation Plan	2019	MassDOT	Massachusetts
3	Massachusetts Pedestrian Transportation Plan	2019	MassDOT	Massachusetts
4	Massachusetts State Rail Plan	2018	MassDOT	Massachusetts
5	WeMoveMassachusetts	2014	MassDOT	Massachusetts
6	Congestion in the Commonwealth 2019	2019	MassDOT	Massachusetts
7	Wellington Circle Study	Ongoing	MassDOT	Medford and Wellington Circle area
8	Managed Lanes Screening Study 2020	2020	MassDOT	Massachusetts
9	Interim Clean Energy and Climate Plan for 2030	2020	MassDOT	Massachusetts
10	Shared Travel Network Study	Ongoing	MassDOT	
11	Bus-on-Shoulder Screening Study	2019	MassDOT	Massachusetts
12	Capital Investment Plan (CIP) & State Transportation Improvement Program (STIP)	2022	MassDOT	Massachusetts
13	East-West Passenger Rail Study	2021	MassDOT	Massachusetts
14	Red Blue Connector	2018	MassDOT	Boston
15	North South Rail Link Feasibility Assessment	2019	MassDOT	Boston

No.	Plan, Policy, Directive Name	Year	Sponsor/ Author(s)	Geography Covered
16	Rte. 2 Corridor Study	Ongoing	MassDOT	Greater Boston
17	South Boston Bypass Road (SBBR) Pilot	Ongoing	MassDOT	Boston
18	Northern Tier—Rte. 2 Rail Service Feasibility Study	Ongoing	MassDOT	Greater Boston
19	I-90 Interchange Study	2020	MassDOT	Western Massachusetts
20	Airport System Plan Study	2010 (update in progress)	MassDOT	Massachusetts
21	Healthy Transportation Policy Directive	2013	MassDOT	Massachusetts
22	Strategic Highway Safety Plan	2018 (updated in 2020)	MassDOT	Massachusetts
23	MBTA Focus40	2019	MBTA	Greater Boston
24	Go Boston 2030	2017	City of Boston	Boston
25	MBTA Rail Vision	2020	MBTA	Greater Boston
26	Opportunities for All	2015	Massachusetts Executive Office of Housing and Economic Development	Massachusetts
27	Choices for Stewardship: Recommendations to Meet the Future of Transportation	2019	Commission on the Future of Transportation in the Commonwealth	Massachusetts
28	Lynn Transit Action Plan	2020	MBTA	Lynn
29	MassDOT Bus Network Redesign	2022	MBTA	Greater Boston
30	Alewife Access Study	2009	MAPC	Alewife Station and Cambridge
31	2020 Comprehensive Regional Transit Plan (CRTP) for WRTA	2020	WRTA	Greater Worcester
32	15-Minute Neighborhoods	2021	Boston Indicators	Greater Boston—Corridors within I-495
33	South Boston Seaport Strategic Transit Plan	Ongoing	Boston Planning and Development Agency	Boston
34	Metro Boston Regional Climate Change Adaptation Strategy Report	2014	MAPC	Greater Boston
35	Berkshire County Regional Transportation Plan	2020	BRPC	Berkshire County
36	Unified Transportation Planning Work Program	2019	BRPC	Berkshire County
37	Destination 2040: The Long-Range Transportation Plan for the Boston Region	2019	Boston Region MPO	Greater Boston

No.	Plan, Policy, Directive Name	Year	Sponsor/ Author(s)	Geography Covered
38	Cape Cod 2020 Regional Transportation Plan	2019	Cape Code Commission	Cape Cod
39	Central Massachusetts Mobility 2040: The 2020 Update	2020	CMRPC	Central Massachusetts
40	Franklin County Regional Transportation Plan 2020	2019	FRCOG	Franklin County
41	Martha's Vineyard Regional Transportation Plan 2020–2040	2019	MV Commission	Martha's Vineyard
42	2020 Merrimack Valley RTP	2019	MVPC	Merrimack Valley
43	Working Towards the Future—The 2020 RTP	2019	MRPC	Montachusett
44	Coordinated Public Transit Human Services Transportation Plan Update—2018	2018	MRPC	Montachusett
45	2020 Long Range Transportation Plan	2019	Nantucket	Nantucket
46	Northern Middlesex Regional Transportation Plan	2019	NMCOG	Northern Middlesex County
47	2020 Long Range Transportation Plan (LRTP)	2019	OCPCRPA	Old Colony Planning Council District
48	Pioneer Valley Regional Transportation Plan (RTP)	2020	PVPC	Pioneer Valley
49	Moving Forward 2045	2019	SRPEDD	Southeastern Massachusetts
50	MTF MBTA Finance Report	2021	MTF	Boston/MBTA service territory
51	West Station Area Transit Study	2020	MAPC	Boston
52	Allston-Brighton Mobility Plan	2021	City of Boston	Boston
53	Transport Kendall: Actions to Transform Mobility	2019?	Transport Kendall	Cambridge
54	Imagine Boston 2030	2017	City of Boston	Boston
55	Worcester Now | Worcester Next	Ongoing	City of Worcester	Worcester
56	Envision Cambridge	2019	City of Cambridge	Cambridge
57	Cambridge Transit Strategic Plan	2015	City of Cambridge	Cambridge
58	Cambridge Bicycle Plan	2020	City of Cambridge	Cambridge
59	Rte. 128 Land Use and Transportation Study	2023	MassDOT	Greater Boston—Rte. 128, Lexington to Newton
60	Silver Line Study	Ongoing	MBTA	Everett

No.	Plan, Policy, Directive Name	Year	Sponsor/ Author(s)	Geography Covered
61	Mystic River Ped Bridge	2009	Massachusetts Department of Conservation and Recreation	Somerville, Everett
62	Next Stop Revere	2020 (Draft)	City of Revere	Revere
63	Closing the Racial Divide in the U.S. and Massachusetts: a Baseline Analysis	2021	MTF	Massachusetts
64	Massachusetts State Hazard Mitigation and Climate Adaptation Plan	2018	Commonwealth of Massachusetts	Massachusetts
65	Reimagining the Future of Massachusetts	2021	MassSenate	Massachusetts
66	Massport Climate Change Adaptation and Resiliency / Massport Resiliency Program / Floodproofing Design Guide	2014	Massachusetts Port Authority (Massport)	Massachusetts
67	Climate Resilience Design Standards and Guidelines	2021	Resilient MA Action Team (RMAT)	Massachusetts
68	MassDOT-FHWA Pilot Project Report: Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery	2015	MassDOT, FHWA	I-93 Central Artery/Tunnel (CA/T) in Boston, MA
69	Destination 2040: Needs Assessment	2019	CTPS	Boston MPO
70	ICC Subregional Booklet (Draft)	2022	Boston Region MPO	Inner Core Committee Subregion
71	Pioneer Valley Regional Housing Plan	2014	PVPC	Pioneer Valley
72	Pioneer Valley Food Security Plan	2014	PVPC	Pioneer Valley
73	Pioneer Valley Green Infrastructure Plan and Environment Plan	2014	PVPC	Pioneer Valley
74	Pioneer Valley Clean Energy Climate Action Plan	2014	PVPC	Pioneer Valley
75	Pioneer Valley Regional Freight Plan	2020	PVPC	Pioneer Valley
76	Valley Vision—Regional Land Use Plan	2013	PVPC	Pioneer Valley
77	Pedestrian Plan for Franklin County 2020	2020	FRCOG	Franklin County
78	Regional Bicycle Plan	2019	SRPEDD	Southeastern Massachusetts

No.	Plan, Policy, Directive Name	Year	Sponsor/ Author(s)	Geography Covered
79	Regional Pedestrian Plan	2018	SRPEDD	Southeastern Massachusetts
80	South Coast Bikeway Closing the Gap Feasibility Study	2021	SRPEDD	Westport, Dartmouth and New Bedford
81	SRPEDD Freight Action Plan	2022	SRPEDD	Southeastern Massachusetts
82	Coordinated Human Services Transportation Plan	2018	SRPEDD	Southeastern Massachusetts
83	North Shore Task Force (NSTF) Subregional Needs Assessment	2020	Boston Region MPO	North Shore Subregion
84	South Shore Committee (SSC) Subregional Needs Assessment	2020	Boston Region MPO	South Shore Subregion
85	South West Area Advisory Planning Committee (SSC) Subregional Needs Assessment	2020	Boston Region MPO	South West Area Subregion
86	Three Rivers Interlocal Council (TRIC) Subregional Needs Assessment	2020	Boston Region MPO	Three Rivers Interlocal Subregion
87	Minuteman Advisory Group on Interlocal Coordination (MAGIC) Subregional Needs Assessment	2020	Boston Region MPO	Minuteman Subregion
88	MetroWest Regional Collaborative (MWRC) Subregional Needs Assessment	2020	Boston Region MPO	MetroWest Subregion
89	North Suburban Planning Council (NSPC) Subregional Needs Assessment	2020	Boston Region MPO	North Suburban Subregion

Thank you

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Beyond Mobility
Massachusetts 2050 Transportation Plan

Appendix C: Needs Assessment

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1.0 Overview

The *Beyond Mobility* Needs Assessment was conducted to gain an understanding of the barriers to transportation access and major problem areas across the Commonwealth. The barriers included those caused by lack of service, congestion, poor safety, asset condition, and/or limited access to jobs, retail, open space, healthcare, and other destinations. The assessment incorporated research of previously adopted plans and policies, data analysis, and public engagement from across the Commonwealth.

Needs Assessment Objectives

- Inform the *Beyond Mobility's* Problem Statements
- Showcase well-known transportation barriers that represent structural barriers for users
- Inform targeted action steps for plan implementation

The Needs Assessment helped identify transportation-related barriers, needs, and inequalities in the Commonwealth. Data analysis summaries highlighted challenges in each of the *Beyond Mobility* Priority Areas and informed the Plan's Problem Statements.

First, elements of the transportation system—including service, congestion, safety, asset condition, and accessibility to jobs, retail, open space, health care, and other destinations—were identified for evaluation. Then, an inventory of plans and policies was used to identify over 300 transportation barriers from previous efforts and policies across Massachusetts. Transportation barriers varied by geography and theme. Barriers were mapped when possible and summarized by theme. Next, an in-depth analysis of transportation needs utilized data to support each *Beyond Mobility* Priority Area. The analysis considered social and geographic equity in order to understand trends and help define the Problem Statements.

2.0 Previous Plan Review & Public Engagement

The initial phase of the Needs Assessment involved understanding the existing conditions as outlined in previous plans and policies and communicated during public engagement. These sources helped to frame the current state of the transportation system and illustrate barriers and needs.

2.1 Previous Plan Review

The review of plans leveraged previous planning efforts and policies throughout the Commonwealth to identify barriers. Plans and policies from various authors were compiled, including MassDOT; MBTA; each of the 13 MPOs; various municipalities; and project-specific plans. Thorough review of each plan yielded documentation of visions, barriers, and recommendations for further analysis. Each of the barriers were summarized by transportation category, themes, and location (if possible) and analyzed for trends. From the 90 plans that were researched, there were a total of 378 barriers identified and categorized as shown in Table 2.1.

Table 2.1 Summary of Previously Identified Transportation Barriers

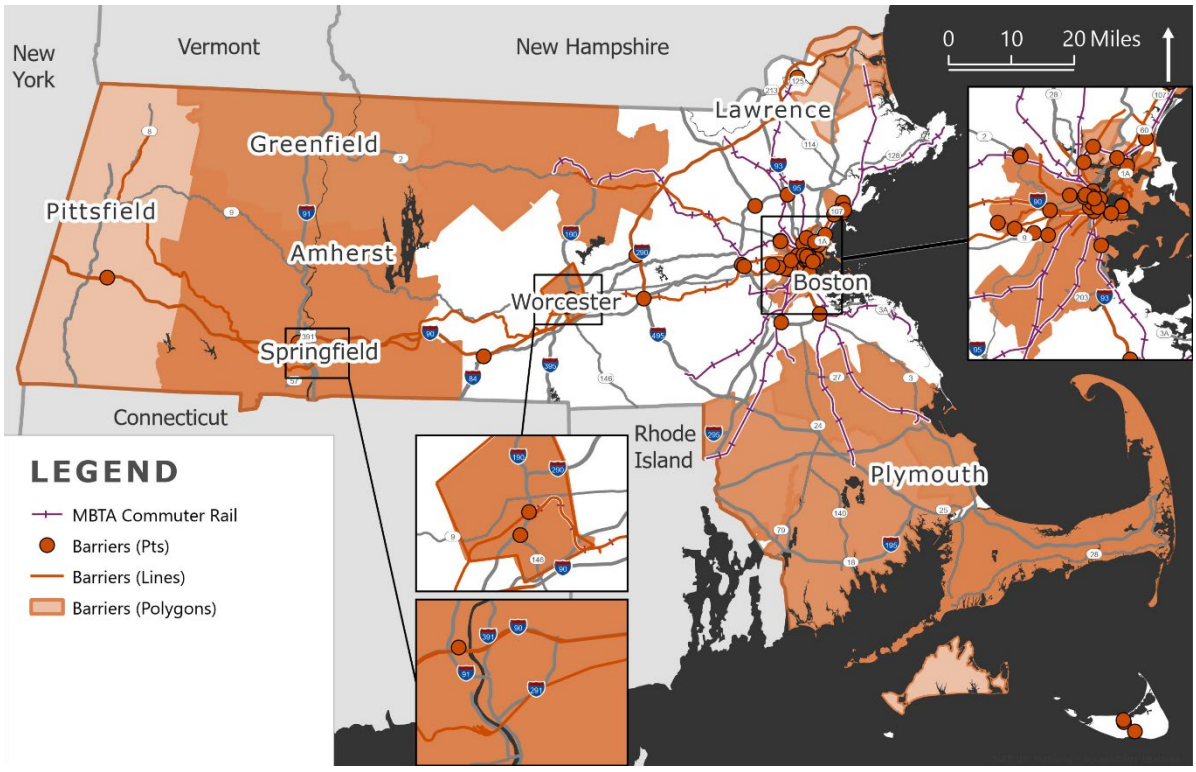
Category	Site-Specific	Non-Site-Specific	Total
Safety	18	75	**93**
Roadways	80	101	**181**
Public Transportation	100	121	**221**
Active Transportation	44	64	**108**
Airports	13	35	**48**
Goods Movement	39	57	**96**
Total[1]	**167**	**211**	**378**

[1] *Barriers could be assigned to more than one category.*

Transportation Barriers Mapping

Where possible, site-specific barriers identified from the plan review were mapped to understand issues across geographies as shown in Figure 2.1. There were barriers identified in the plan review that focused on policy, statewide themes or general improvements and were unable to be mapped. The site-specific barrier mapping exercise helped to understand the various themes that are present throughout the state (i.e., safety, mobility, and environmental concerns). While many plans identified issues at specific locations, as can be seen in Figure 2.1, there are large parts of the Commonwealth that are not represented in the plans inventoried.

Figure 2.1 Previous Plan Review—Barriers by Geography



Key Findings

Plans identified a range of problems, from site-specific issues (e.g., roadway bottlenecks) to broad issues (e.g., housing affordability). The barriers were reviewed for trends and informed the development of *Beyond Mobility* problem statements. Key findings are summarized below, organized by *Beyond Mobility* Priority Areas.

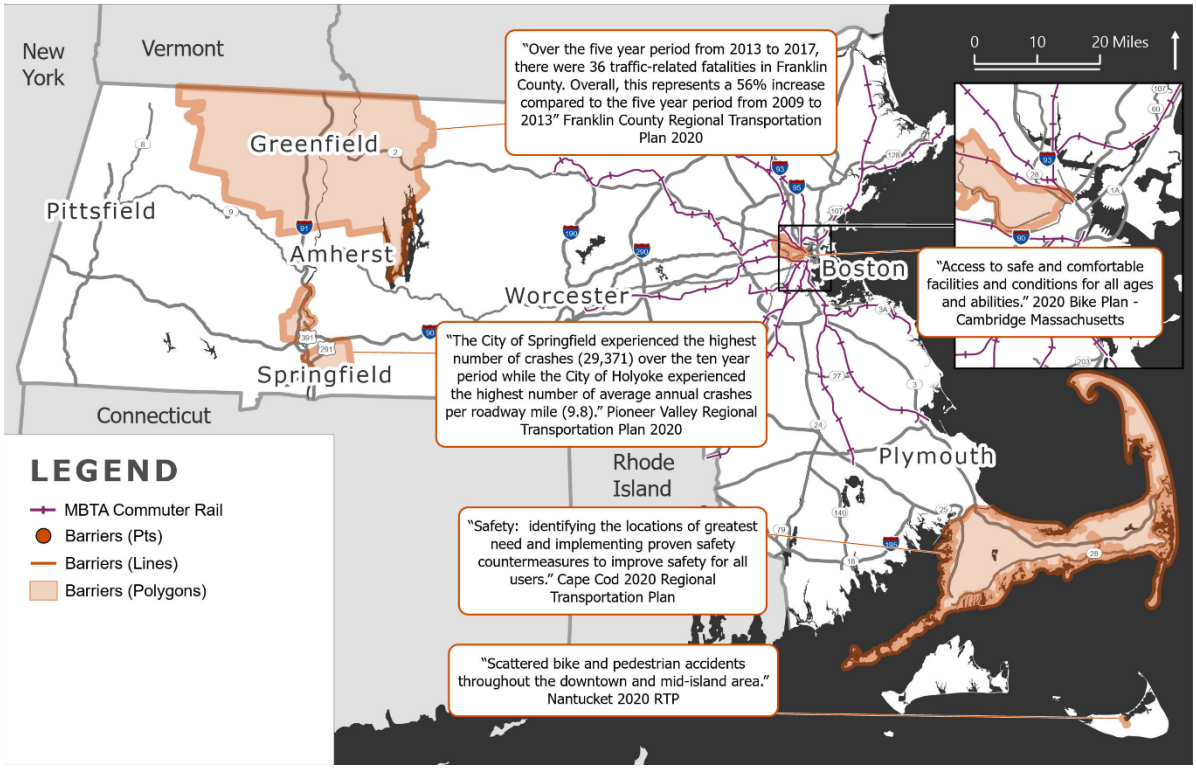
Safety

Most safety barriers documented in the needs assessment, across all transportation modes, were identified through research into previous plans. The review showed disparities in safety, especially for walkers and bicyclists, in rural communities and traditionally marginalized populations; highlighted safety concerns related to public transportation; and emphasized a need for continued safety research and education. Table 2.2 summarizes the key findings related to barriers that support the *Beyond Mobility* Safety problem statements. Figure 2.2 illustrates site-specific examples of safety barriers.

Table 2.2 Non-Site-Specific Safety Barriers

Beyond Mobility Problem Statements	Supporting Non-Site-Specific Source(s)	Non-Site-Specific Example Quote(s)
Environmental Justice communities are disproportionately burdened by transportation-related injuries and deaths, particularly those involving pedestrians and bicyclists.	*Strategic Highway Safety Plan* *MassDOT Statewide Pedestrian Transportation Plan* *Destination 2040: Needs Assessment*	"Data shows that while minority group individuals make up 34.9% of the national population, they suffer 46.1% of pedestrian deaths." *MassDOT Statewide Pedestrian Transportation Plan*
Massachusetts traffic fatalities and fatalities rates have risen since 2019, despite lower vehicle miles traveled.	*Strategic Highway Safety Plan* *MassDOT Statewide Pedestrian Transportation Plan* *Destination 2040: Needs Assessment* *Massachusetts State Rail Plan*	"Actual fatalities exceeded the targets set, further emphasizing the need to correct course and change the approach." *Strategic Highway Safety Plan 2023*
People bicycling in Massachusetts experience an unsafe and low-comfort network and people in Massachusetts' Gateway Cities and rural areas often experience safety issues when walking due to poor sidewalk quality and limited sidewalk coverage in these communities.	*Healthy Transportation Policy Directive* *Strategic Highway Safety Plan* *MassDOT Statewide Pedestrian Transportation Plan* *MassDOT Statewide Bicycle Transportation Plan* *Destination 2040: Needs Assessment* *2020 Bike Plan—Cambridge Massachusetts*	"When pedestrian facilities, including sidewalks, ramps, and crosswalks, are absent, poorly maintained, or unsafe, it puts people in danger, encourages trips in cars that could reasonably be made on foot, or limits mobility altogether." *MassDOT Statewide Pedestrian Transportation Plan* "Even the most developed local bike networks in Massachusetts do not form a connected network, and most shared-use paths lack high-comfort connections to adjacent town centers. A simple bike trip can quickly become uncomfortable, unappealing, or even unsafe when navigating discontinuous bikeways, a single stressful intersection, or poor transitions between bikeways." *MassDOT Statewide Pedestrian Transportation Plan*
Residents perceive an unsafe environment on public transportation due to a combination of high-profile safety events and more personal incidents.	*Destination 2040: Needs Assessment*	"The MBTA reported recent increases in fatalities on its system, particularly on the commuter rail. The MBTA and the RTAs in the Boston region must continue to monitor and reduce bus collisions, derailments, and other accidents that may contribute to negative safety outcomes." *Destination 2040: Needs Assessment*
There is a need for additional safety-related research and education in a number of other areas, including emerging technologies, drivers' education, and implications of the lack of cellular service in rural areas.	*Choices for Stewardship: Recommendations to Meet the Future of Transportation* *Envision Cambridge* *Montachusett 2020 RTP* *Old Colony 2020 LRTP*	"A transportation system can be very efficient, but if people do not believe it serves their needs, know how to navigate the system, or use it reliably and safely, that efficiency is wasted. Modern communications tools and an expanded education program will improve mobility, especially when grouped with improvements to physical infrastructure." *Envision Cambridge*

Figure 2.2 Examples of Site-Specific Safety Barriers


New York
Vermont
Connecticut
Rhode Island
Greenfield
Pittsfield
Amherst
Springfield
Worcester
Boston
Plymouth
0 10 20 Miles
"Over the five year period from 2013 to 2017, there were 36 traffic-related fatalities in Franklin County. Overall, this represents a 56% increase compared to the five year period from 2009 to 2013" Franklin County Regional Transportation Plan 2020
"Access to safe and comfortable facilities and conditions for all ages and abilities." 2020 Bike Plan - Cambridge Massachusetts
"The City of Springfield experienced the highest number of crashes (29,371) over the ten year period while the City of Holyoke experienced the highest number of average annual crashes per roadway mile (9.8)." Pioneer Valley Regional Transportation Plan 2020
"Safety: identifying the locations of greatest need and implementing proven safety countermeasures to improve safety for all users." Cape Cod 2020 Regional Transportation Plan
"Scattered bike and pedestrian accidents throughout the downtown and mid-island area." Nantucket 2020 RTP
LEGEND
MBTA Commuter Rail
Barriers (Pts)
Barriers (Lines)
Barriers (Polygons)

Destination Connectivity

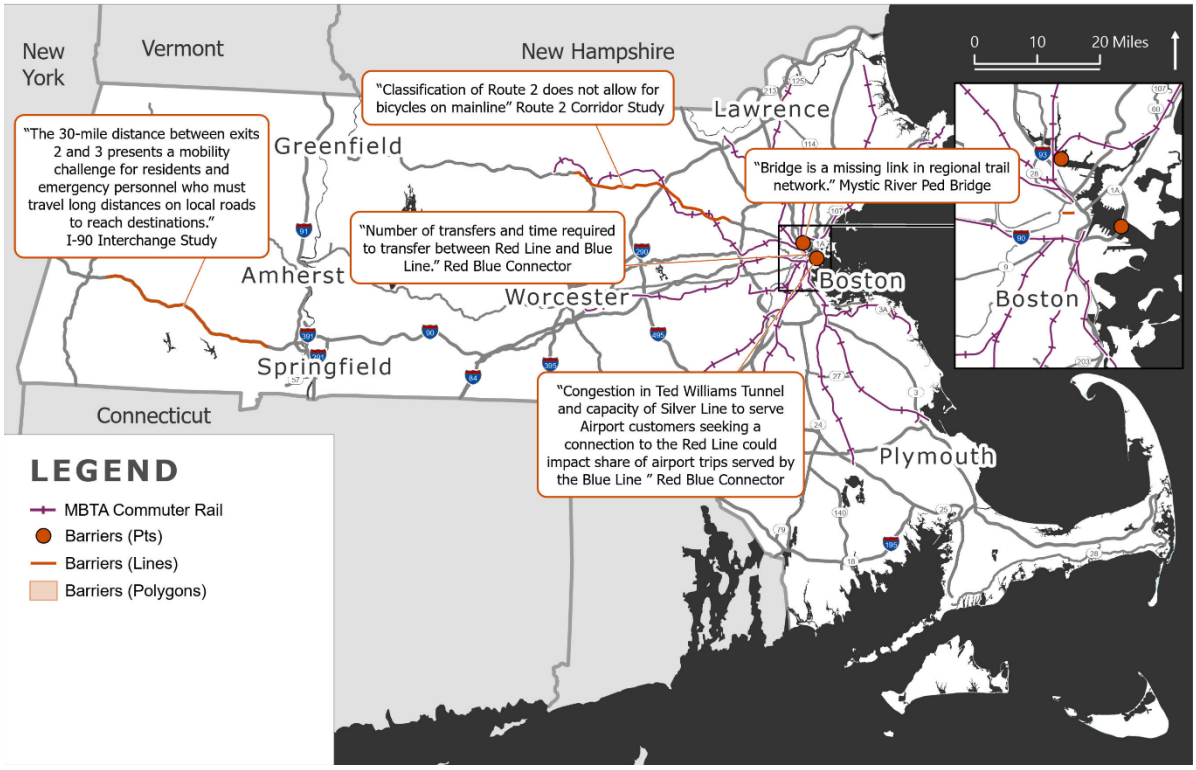
Network connectivity barriers were frequently observed in previous plans and policies. Common themes related to transportation system inequities, limited multimodal connections and options, and disproportionate connectivity barriers outside the urban core—all impacting access to destinations. Table 2.3 summarizes the key findings related to barriers that support the *Beyond Mobility* Destination Connectivity problem statements. Figure 2.3 illustrates site-specific examples of connectivity barriers.

Table 2.3 Non-Site-Specific Destination Connectivity Barriers

Beyond Mobility Problem Statements	Supporting Non-Site-Specific Source(s)	Non-Site-Specific Example Quote(s)
People living in Environmental Justice communities are burdened by connectivity inequities across our transportation system, limiting their access to opportunities.	*Reimagining the Future of Massachusetts* *Go Boston 2030* *Choices for Stewardship: Recommendations to Meet the Future of Transportation* *MBTA Rail Vision* *Montachusett 2020 RPT*	"Significant portions of Dorchester, Hyde Park, Jamaica Plain, Mattapan, and South Boston continue to face long walks to rapid transit stations. Residents in these areas rely on less frequent buses or other modes to get around." *Go Boston 2030*

Beyond Mobility Problem Statements	Supporting Non-Site-Specific Source(s)	Non-Site-Specific Example Quote(s)
The lack of contiguous, safe, high-comfort bicycle or pedestrian pathways connecting existing bicycle facilities limits the ability of people bicycling to access key destinations.	*Go Boston 2030* *SRPEDD Regional Bicycle Plan* *SRPEDD Regional Pedestrian Plan*	"Routes 1, 28, 6, 44, 105, 123 and 138—These corridors have very limited bicycle facilities but are, in many cases, the only option for accessing major employment, retail, transit and other priority destinations. They vary in composition in regard to lane layout, speed and other factors, but they all present a challenge for cyclists due to lack of safe infrastructure, safe crossing mechanisms and general bicycle friendliness. In some cases, bicycle travel is prohibited." *SRPEDD Regional Bicycle Plan*
Residents outside of inner core areas, particularly those in rural areas, lack convenient transit services and other non-vehicular transportation options, and feel disconnected from cultural, economic, and other opportunities.	*Choices for Stewardship: Recommendations to Meet the Future of Transportation* *Montachusett 2020 RTP* *2020 Merrimack Valley RTP* *SRPEDD RTP 2020*	"Approximately 84% of respondents would use transit to work if available." *Montachusett 2020 RTP* "Over a 3-month period, almost 62% were unable to a make a medical appointment due to lack of transportation; 57% said transportation was a major factor in whether or not they schedule a medical appointment." *Montachusett 2020 RTP*
Though reduced car travel supports decarbonization, people traveling in Massachusetts find it difficult to get around using other modes, including transit.	*MassDOT Statewide Bicycle Transportation Plan* *SRPEDD RTP 2020*	"Many gaps exist in the transit system within the SRPEDD region, as well as from the SRPEDD region to other regions and across the Rhode Island state line. Connections are needed to bridge the transit gaps between urban areas to cover the entire SRPEDD area and beyond." *SRPEDD RTP 2020*

Figure 2.3 Examples of Site-Specific Destination Connectivity Barriers


New York
Vermont
New Hampshire
Connecticut
0 10 20 Miles
"The 30-mile distance between exits 2 and 3 presents a mobility challenge for residents and emergency personnel who must travel long distances on local roads to reach destinations." I-90 Interchange Study
"Classification of Route 2 does not allow for bicycles on mainline" Route 2 Corridor Study
"Number of transfers and time required to transfer between Red Line and Blue Line." Red Blue Connector
"Bridge is a missing link in regional trail network." Mystic River Ped Bridge
"Congestion in Ted Williams Tunnel and capacity of Silver Line to serve Airport customers seeking a connection to the Red Line could impact share of airport trips served by the Blue Line " Red Blue Connector
Greenfield
Amherst
Springfield
Worcester
Lawrence
Boston
Boston
Plymouth
LEGEND
MBTA Commuter Rail
Barriers (Pts)
Barriers (Lines)
Barriers (Polygons)

Travel Experience

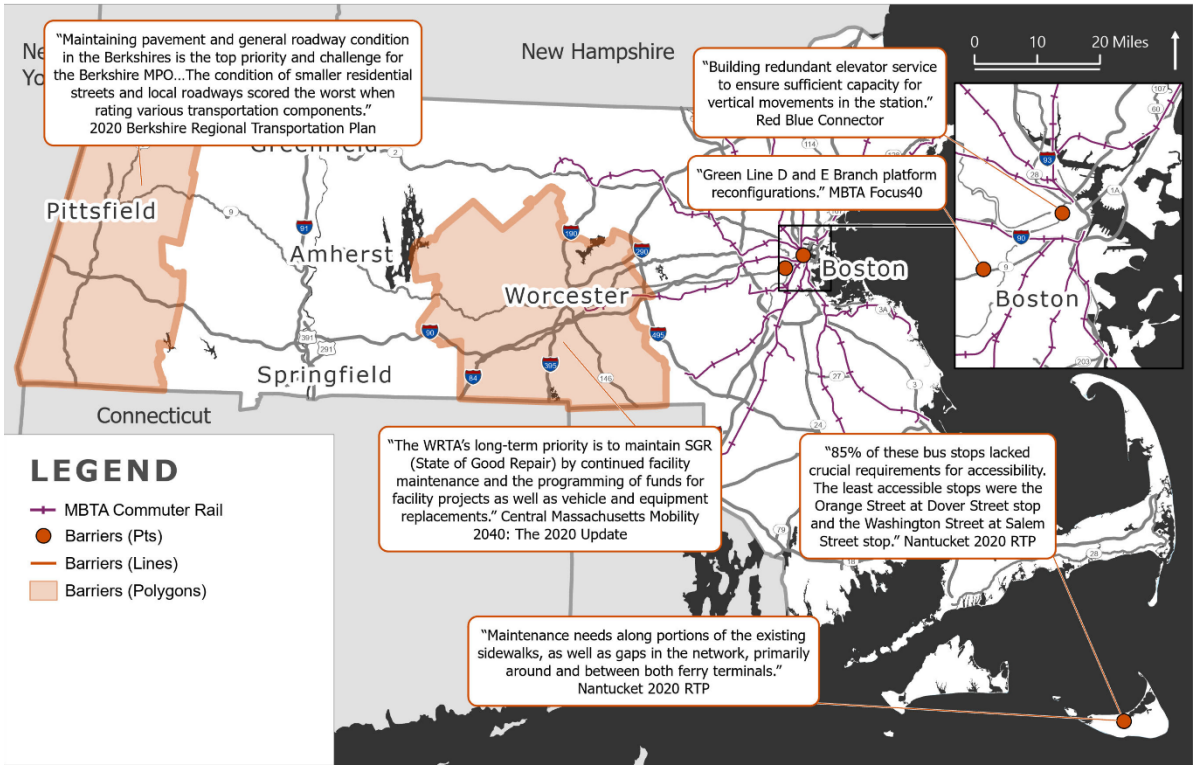
Related to travel experience, the previous plans and policies highlighted challenges with the ability to navigate the transit and active transportation networks, the impact of high transportation costs on historically marginalized populations, and accessibility issues at transit stops/stations. Table 2.4 summarizes the key findings related to barriers that support the *Beyond Mobility* Travel Experience problem statements. Figure 2.4 illustrates site-specific examples of barriers related to travel experience.

Table 2.4 Non-Site-Specific Travel Experience Barriers

Beyond Mobility Problem Statements	Supporting Non-Site-Specific Source(s)	Non-Site-Specific Example Quote(s)
Environmental Justice communities are in need of an enhanced user experience and increased affordability on transit.	*Go Boston 2030* *Montachusett 2020 RTP*	"Transportation costs exceed the Boston average, relative to housing cost, in the entirety of Dorchester, Hyde Park, Jamaica Plain, Mattapan, Roslindale, South Boston, and West Roxbury." *Go Boston 2030*
Missing sidewalks, curb ramps, and crosswalks limit mobility options for older adults and people with disabilities. This is a particular issue in rural communities, which	*Franklin County RTP 2020* *Pedestrian Plan for Franklin County 2020*	"Some improvement may be needed where there are gaps in the sidewalk, missing connections to other neighborhood roads, sidewalks in poor condition, and missing crosswalks and

Beyond Mobility Problem Statements	Supporting Non-Site-Specific Source(s)	Non-Site-Specific Example Quote(s)
have higher concentrations of these residents.		curb ramps." *Pedestrian Plan for Franklin County 2020*
Transit customers often find it challenging to understand and navigate the transit options available to them.	*2020 Comprehensive Regional Transit Plan (CRTP)—WRTA* *Nantucket 2020 RTP* *Lynn Transit Action Plan*	"While most of Lynn residents live within a quarter mile of a bus stop, only 40 percent of the 408 stops in Lynn are considered accessible and most bus stops do not feature amenities like shelters or real-time bus arrival information, affecting customer experience." *Lynn Transit Action Plan*
Bicyclists report that wayfinding and amenities at facilities are confusing or substandard.	*2020 Bike Plan—Cambridge Massachusetts* *SRPEDD Regional Bicycle Plan*	"There were requests for greater separation on some of the major streets, which we recognize may be desirable for people riding bikes because they provide the most direct path of travel to some destinations." *2020 Bike Plan—Cambridge Massachusetts*
The systems and protocols that support excellent customer service are not always prioritized.	*Massachusetts Freight Plan* *2020 Comprehensive Regional Transit Plan (CRTP)—WRTA*	"Some users experienced challenges in Massachusetts when transferring, acquiring, and renewing commercial drivers' licenses for truckers." *Massachusetts Freight Plan*

Figure 2.4 Example of Site-Specific Travel Experience Barriers


"Maintaining pavement and general roadway condition in the Berkshires is the top priority and challenge for the Berkshire MPO...The condition of smaller residential streets and local roadways scored the worst when rating various transportation components."
2020 Berkshire Regional Transportation Plan
New Hampshire
"Building redundant elevator service to ensure sufficient capacity for vertical movements in the station."
Red Blue Connector
"Green Line D and E Branch platform reconfigurations." MBTA Focus40
0 10 20 Miles
Pittsfield
Amherst
Worcester
Springfield
Boston
Boston
Connecticut
"The WRTA's long-term priority is to maintain SGR (State of Good Repair) by continued facility maintenance and the programming of funds for facility projects as well as vehicle and equipment replacements." Central Massachusetts Mobility 2040: The 2020 Update
"85% of these bus stops lacked crucial requirements for accessibility. The least accessible stops were the Orange Street at Dover Street stop and the Washington Street at Salem Street stop." Nantucket 2020 RTP
"Maintenance needs along portions of the existing sidewalks, as well as gaps in the network, primarily around and between both ferry terminals."
Nantucket 2020 RTP
LEGEND
MBTA Commuter Rail
Barriers (Pts)
Barriers (Lines)
Barriers (Polygons)

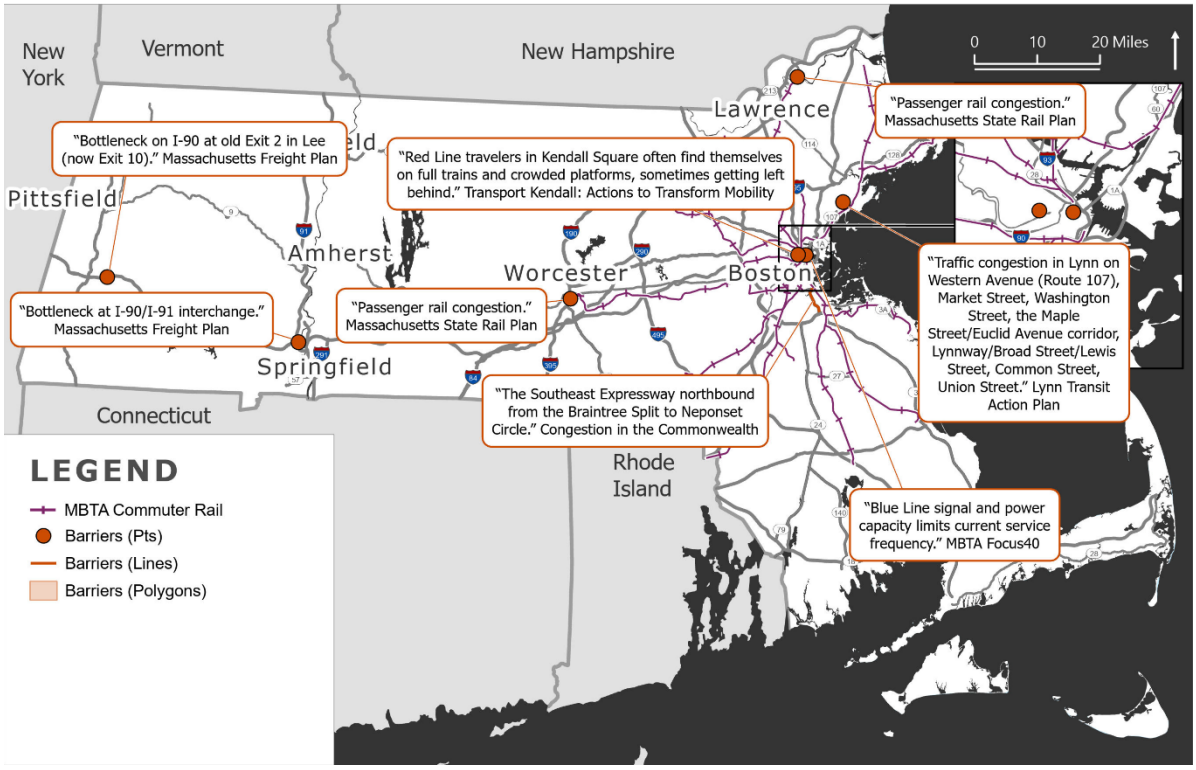
Reliability

The previous plans and policies highlighted reliability challenges, including its impact on the ability for people to access destinations and its impact on the attractiveness of transit and goods movement by freight. Table 2.5 summarizes the key findings related to barriers that support the *Beyond Mobility* Reliability problem statements. Figure 2.5 illustrates site-specific examples of reliability barriers.

Table 2.5 Non-Site-Specific Reliability Barriers

Beyond Mobility Problem Statements	Supporting Non-Site-Specific Source(s)	Non-Site-Specific Example Quote(s)
Massachusetts travelers by any mode are highly vulnerable to reliability issues, resulting in diminished access to everyday needs.	*Congestion in the Commonwealth* *MBTA Rail Vision* *Managed Lanes Screening Study 2020* *Old Colony 2020 LRTP* *Cape Cod 2020 Regional Transit Plan* *Rte. 128 Land Use and Transportation Plan*	"It's the unpredictability of their commutes that shape how people feel about transportation: the difference between an "average" day and a "bad" day can be enormous in terms of how much time people spend in traffic, whether on cars, buses, or trains." *Congestion in the Commonwealth* "On many of these segments, travel times during the morning peak are now more than double travel times under free-flow conditions. And on Routes 1 and 2, travel times are three times free-flow travel." *Congestion in the Commonwealth*
MassDOT's roadway and transit networks do not optimize travel during off-peak periods and must adapt to changing congestion patterns.	*Coordinated Human Services Transportation Plan* *2020 Comprehensive Regional Transit Plan (CRTP)—WRTA* *Managed Lanes Screening Study 2020* *Berkshire County RTP*	"The need for evening and weekend service has been repeatedly expressed by communities and individuals throughout the region and is considered to be a top priority transit need." *Coordinated Human Services Transportation Plan*
Roadway congestion diminishes transit reliability, limiting the competitiveness of sustainable transportation options.	*Congestion in the Commonwealth* *MBTA Focus40*	"But the congestion that is the subject of this report is affecting the attractiveness and reliability of buses. As noted in Chapter 2, the MBTA now assumes that buses will travel at 11.5 miles per hour on average, the slowest speeds since data has been made available." *Congestion in the Commonwealth*
Supply chains are disrupted when freight travel is unreliable.	*Destination 2040: Needs Assessment* *SRPEDD Freight Action Plan 2022* *Old Colony 2020 LRTP*	"Traffic congestion, including time-consuming commutes and longer truck freight travel times, can contribute to slowing economic growth and a less competitive regional economy." *Destination 2040: Needs Assessment*

Figure 2.5 Examples of Site-Specific Reliability Barriers


New York
Vermont
New Hampshire
0 10 20 Miles
Lawrence
"Passenger rail congestion." Massachusetts State Rail Plan
"Bottleneck on I-90 at old Exit 2 in Lee (now Exit 10)." Massachusetts Freight Plan
"Red Line travelers in Kendall Square often find themselves on full trains and crowded platforms, sometimes getting left behind." Transport Kendall: Actions to Transform Mobility
Pittsfield
Amherst
Worcester
Boston
"Traffic congestion in Lynn on Western Avenue (Route 107), Market Street, Washington Street, the Maple Street/Euclid Avenue corridor, Lynnway/Broad Street/Lewis Street, Common Street, Union Street." Lynn Transit Action Plan
"Bottleneck at I-90/I-91 interchange." Massachusetts Freight Plan
"Passenger rail congestion." Massachusetts State Rail Plan
Springfield
"The Southeast Expressway northbound from the Braintree Split to Neponset Circle." Congestion in the Commonwealth
Connecticut
Rhode Island
"Blue Line signal and power capacity limits current service frequency." MBTA Focus40
LEGEND
MBTA Commuter Rail
Barriers (Pts)
Barriers (Lines)
Barriers (Polygons)

Supporting Clean Transportation

The previous plans and policies highlighted challenges related to the impact of single occupancy vehicle trips on climate change and barriers to advancing clean transportation options such as infrastructure needs and land use/zoning policies. Table 2.6 summarizes the key findings related to barriers that support the *Beyond Mobility* Supporting Clean Transportation problem statements.

Table 2.6 Non-Site-Specific Supporting Clean Transportation Barriers

***Beyond Mobility* Problem Statements**	**Supporting Non-Site-Specific Source(s)**	**Non-Site-Specific Example Quote(s)**
Transportation is the largest contributor of carbon emissions in Massachusetts and transportation-related emissions are disproportionately concentrated in Environmental Justice communities.	*Choices for Stewardship: Recommendations to Meet the Future of Transportation* *Montachusett 2020 RTP* *Cape Cod 2020 Regional Transportation Plan*	"Transportation is not only affected by climate change—it is now the largest and fastest growing emitter of greenhouse gas emissions." *Choices for Stewardship: Recommendation to Meet the Future of Transportation*
Availability of suitable infrastructure is a potential barrier to low or zero emission transportation choices.	*Choices for Stewardship: Recommendations to Meet the Future of Transportation* *Interim Clean Energy and Climate Plan for 2030*	"Growth in EV buses and other heavy-duty vehicles may require costly transmission and distribution system upgrades." *Choices for Stewardship: Recommendation to Meet the Future of Transportation*

Beyond Mobility Problem Statements	Supporting Non-Site-Specific Source(s)	Non-Site-Specific Example Quote(s)
Existing land use patterns reinforce car travel and exclude lower-income people from having sufficient modal choices.	*Choices for Stewardship: Recommendations to Meet the Future of Transportation* *15-Minute Neighborhoods* *Rte. 128 Land Use and Transportation Study*	"Despite easy commuter rail access to Boston and good bones with a village center, Downtown Reading's built environment is nonetheless very car centric. This is typical of many suburban towns throughout Greater Boston; they have valuable commuter rail stations but are not able to maximize their potential. Zoning has been largely exclusionary, leading to low housing density, a lack of residential diversity, and only light suburban downtown activity." *15-Minute Neighborhoods*

Resiliency

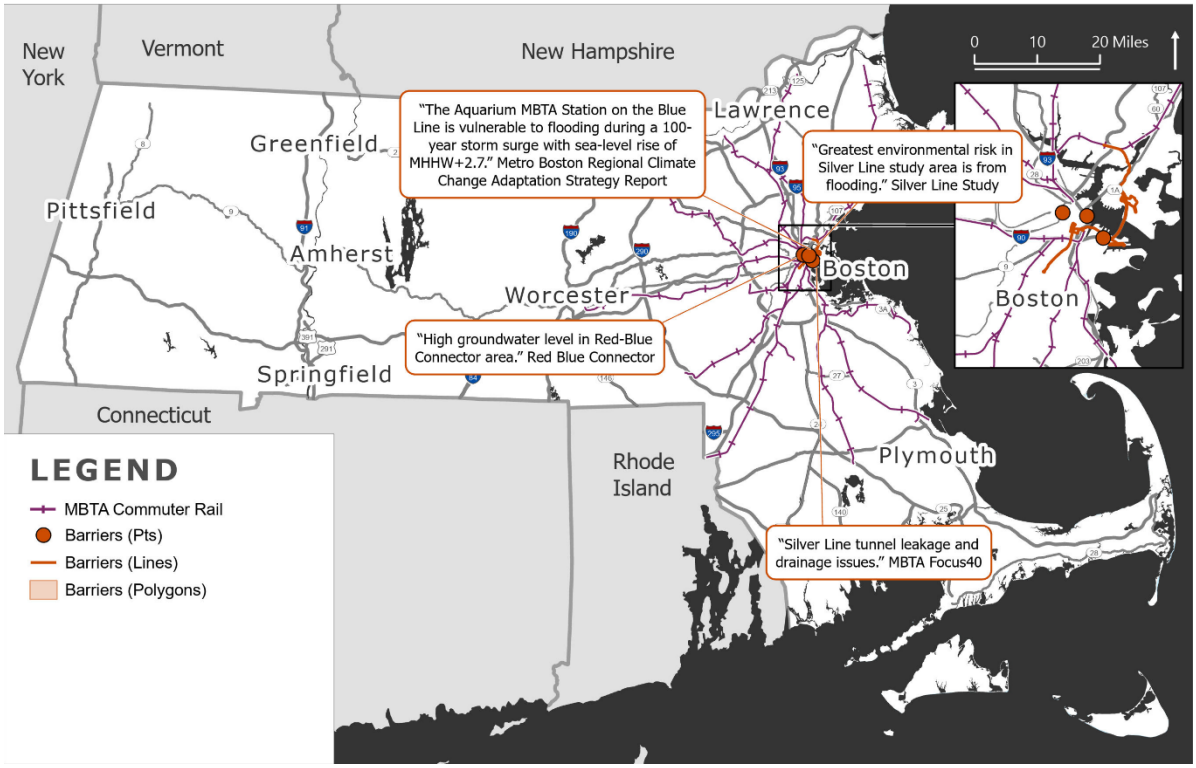
Related to resiliency, the previous plans and policies noted the significant transportation infrastructure and residents across the Commonwealth that are vulnerable to the impacts of climate change such as extreme weather and sea level rise. Table 2.7 summarizes the key findings related to barriers that support the *Beyond Mobility* Resiliency Problem Statements. Figure 2.6 illustrates site-specific examples of resiliency barriers.

Table 2.7 Non-Site-Specific Resiliency Barriers

Beyond Mobility Problem Statements	Supporting Non-Site-Specific Source(s)	Non-Site-Specific Example Quote(s)
Significant transportation infrastructure in Massachusetts is potentially exposed to natural hazards, including sea level rise and storm surge, riverine and coastal flooding, extreme heat, and others.	*Massachusetts State Hazard Mitigation and Climate Adaptation Plan* *Go Boston 2030* *Metro Boston Regional Climate Change Adaptation Strategy Report* *Montachusett 2020 RTP* *Envision Cambridge* *Pioneer Valley Regional Housing Plan*	"The Commonwealth is exposed to numerous natural hazards, and these hazards are being exacerbated by rising temperatures, changes in precipitation, extreme weather, and sea level rise." *Massachusetts State Hazard Mitigation and Climate Adaptation Plan* "As sea level rise progresses, roadways, subway and highway tunnels, Logan International Airport, and other critical elements in our transportation network could be inundated." *Massachusetts State Hazard Mitigation and Climate Adaptation Plan* "Particularly pavement, exposed to high temperatures over longer periods of time, which can cause buckling and lead to increased failures… Railroad tracks can expand in extreme heat, causing the track to "kink" and derail

Beyond Mobility Problem Statements	Supporting Non-Site-Specific Source(s)	Non-Site-Specific Example Quote(s)
		trains." *Massachusetts State Hazard Mitigation and Climate Adaptation Plan*
A significant share of Massachusetts' population lives in areas at high risk of natural hazards.	*Massachusetts State Hazard Mitigation and Climate Adaptation Plan* *Imagine Boston 2030* *Go Boston 2030* *Metro Boston Regional Climate Change Adaptation Strategy Report*	"For the purposes of the SHMCAP, the entire population of the Commonwealth of Massachusetts is considered to be exposed to extreme temperatures. While extreme temperatures are historically more common in the inland portions of the Commonwealth, the impacts to people may be more severe in densely developed urban areas around the state." *Massachusetts State Hazard Mitigation and Climate Adaptation Plan*

Figure 2.6 Examples of Site-Specific Resiliency Barriers



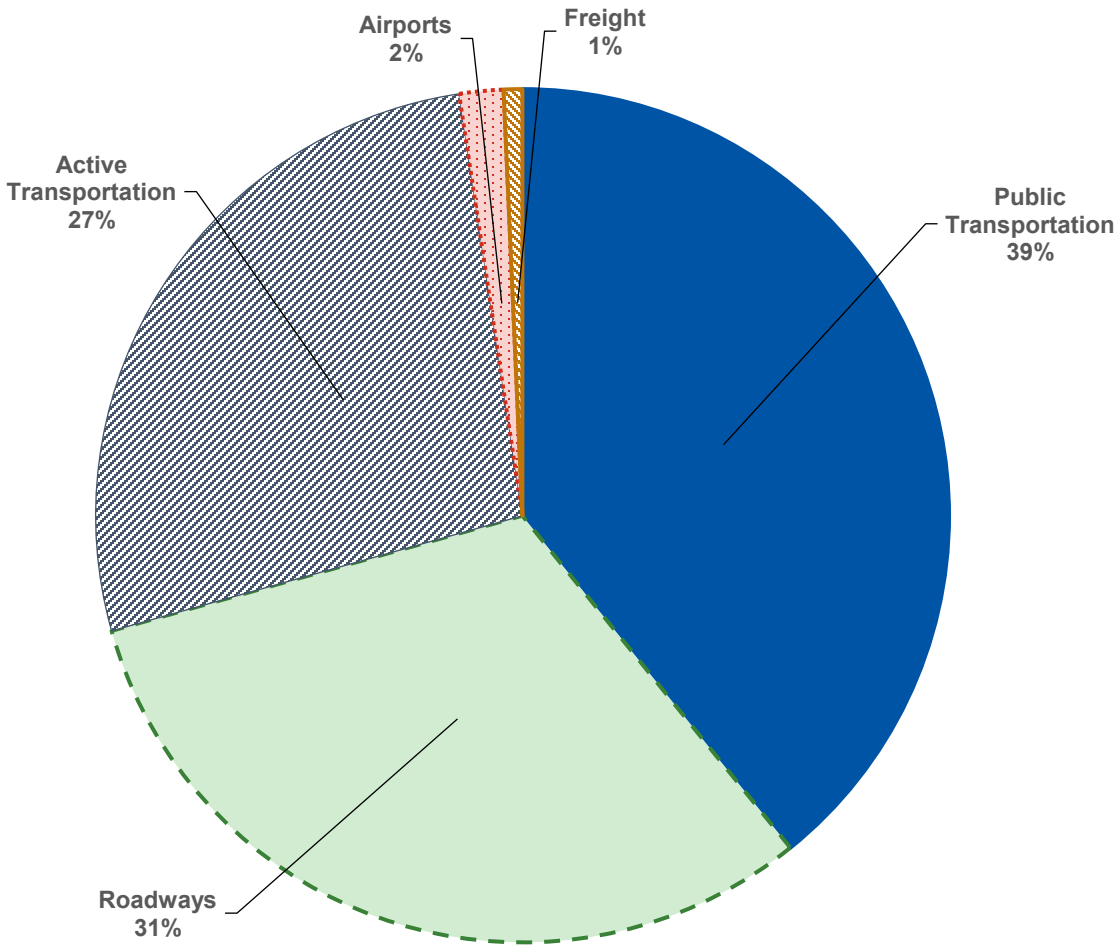
2.2 Public Engagement

The results of the Summer 2022 *Beyond Mobility* Phase I Vision, Values, & Needs Survey were also used to pinpoint specific themes or locations for further investigation. This public survey asked participants to highlight up to three locations throughout the Commonwealth where transportation improvements are needed. Nearly 1,000 locations with transportation issues were identified and

analyzed in order to support an understanding of needs from the perspective of transportation system users. Figure 2.7 summarizes the responses by transportation mode category.

The *Beyond Mobility* Phase II Priorities & Tradeoffs Survey—conducted in the Fall of 2022—garnered over 2,500 responses. Since the *Beyond Mobility* Phase II Priorities & Tradeoffs Survey focused on tradeoffs across budgetary programs and not site-specific needs, those results are not discussed in detail in this Appendix. Those results are summarized throughout *Beyond Mobility*, particularly in Chapter 3.

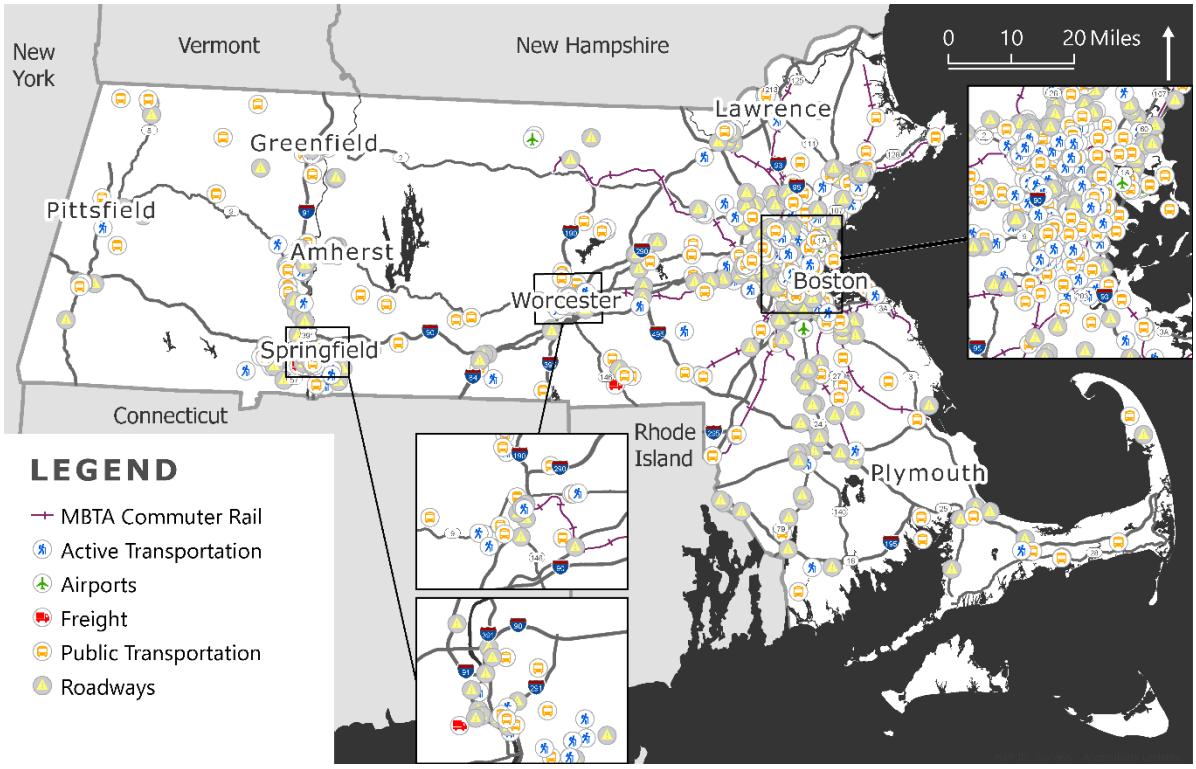
Figure 2.7 Transportation Needs Identified by Transportation Category



Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022. Includes all survey responses.

Over half of the site-specific issues were clustered in Greater Boston, with a relatively even distribution of remaining responses across the Commonwealth, as shown in Figure 2.8.

Figure 2.8 Site-Specific Transportation Needs Identified by Transportation Category



Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022. Includes only site-specific responses. Broad/general theme responses could not be mapped.

Participants highlighted challenges such as a lack of transportation options, missing multimodal connections that impact their ability to access jobs and other locations, safety concerns for walking and biking, transit and highway unreliability, resiliency concerns, and roadway congestion and bottlenecks. Trends among various respondent groups include:

- Over 125 responses were received from people of color. Common concerns among this demographic include a lack of transit connectivity and reliability challenges.
- Over 100 responses were received from people 65 and over. This group highlighted challenges with transit connectivity, safety when biking, and unreliability of the roadway and transit systems.
- More than half of respondents indicated they use transit. These respondents most frequently noted concerns with safety and connectivity.
- Nearly half of respondents reported using a bicycle as at least one mode of travel. Over 80 percent of these respondents noted connectivity concerns.

Table 2.8 provides example quotes from survey responses that illustrate these key takeaways.

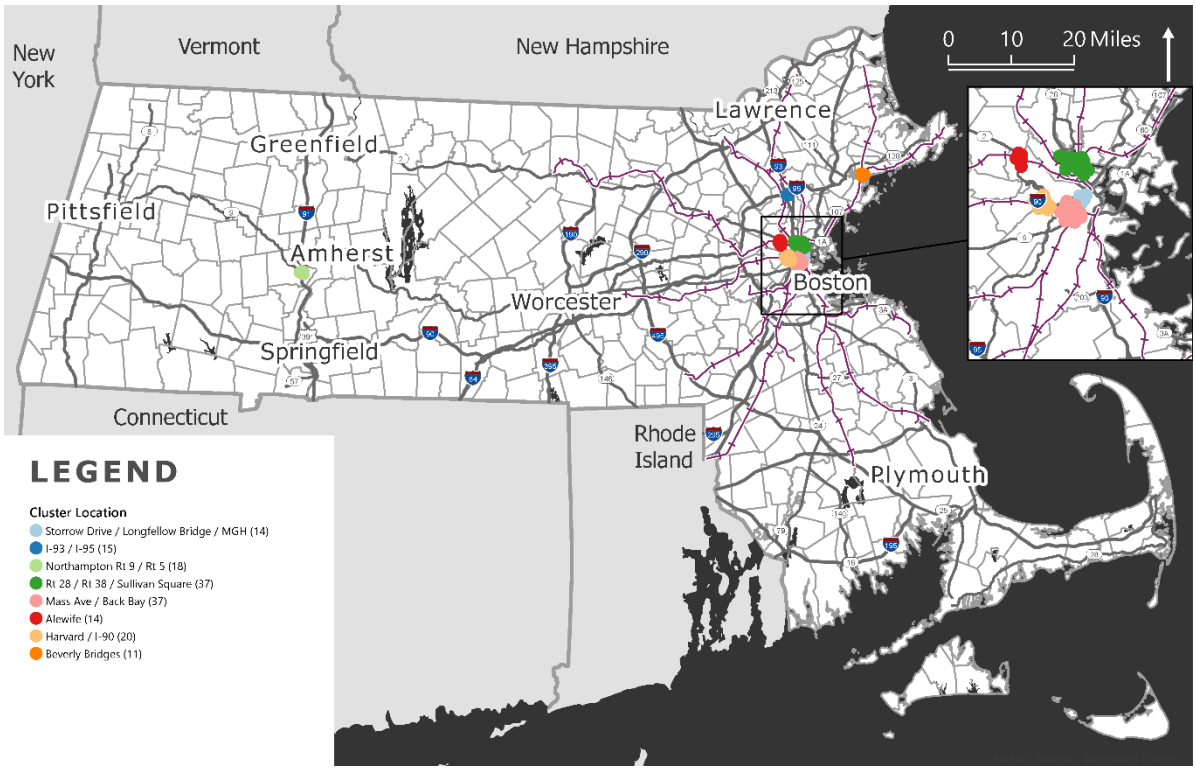
Table 2.8 Site-Specific Transportation Needs Identified by *Beyond Mobility* Respondents

Example Quotes from Respondents	Respondent Demographics
"My area has limited transportation options. Taking the bus costs money but it's not always reliable. I have to walk to get to my job when my parents or siblings' transportation isn't available. I don't have a driver's license as of yet."	22 to 34/Low Income/ White/Central Mass Walker
"I drive by myself most often because of the convenience (I go when I want) and the time it takes for point-to-point travel. Biking to my major destinations feels too far or unsafe or both. The bus/train/transit system is too infrequent, not reliable, and too indirect, taking too much time compared to the alternative (driving or Uber/Lyft)."	65 & Over/White/Greater Boston Walker
"The main challenge for getting outside of my area is that I simply cannot. My town has no rail connection for a majority of the year, only having service for 3 months, and even then, with only 3 trains a day. Even if I want to get around my area, it's difficult. Buses only typically come every hour and it's quite slow. Life would be made much better if I was able to bike to places, but it's straight up dangerous in many places to bike, and even if I can bike there is nowhere to lock my bike."	Under 18/Cape Cod/Person of Color/Transit (Bus) User
"I do not commute into Boston but go suburb to suburb."	Rural/White/Metro West Walker
"Boston needs to prioritize the quality of life and the safety of its residents and bike users over the needs of out-of-town commuters."	Person of Color/Greater Boston Biker and Walker
"I have to commute every day through Sullivan circle, mainly by bike and sometimes walking. It is so dangerous. Cars just don't pay attention to anyone who are not in cars. Even the lights put in place explicitly for us to cross and give the cars a red light are often ignored."	35 to 44/White/Greater Boston Transit User & Walker/Biker
"I feel unsafe bicycling anywhere. I have been hit by a car on Mass Ave and broke bones and was in the hospital."	45-54/Urban/White/Greater Boston Transit User & Walker/ Biker
"Unsafe infrastructure for pedestrians and bicyclists. The road network was designed with cars as the primary users. We need a complete rethinking that puts *people* (NOT CARS) at the center. This means BRT, protected and separated bike lanes, full sidewalk networks, etc."	22 to 34/White/North Shore Private Vehicle Owner and Walker/Biker
"This underpass* floods every time it rains, hindering bicycle traffic and bus service." (*Referencing Washington Street under railroad tracks in Somerville)	22 to 34/White/Greater Boston Non-Automobile User
"Congestion getting into Boston and the Cape; lack of railway to get from Western MA to Eastern MA which would help reduce congestion on our roadways; limited airline choices in Worcester—need something on par to Logan to help spread the demand."	45 to 54/White/Rural/Western Massachusetts Private Vehicle Owner and Walker

Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

Further analysis was completed to understand if there were locations repeatedly commented on. The results of this analysis are shown in Figure 2.9 and illustrate several clusters of issues. The Sullivan Square area and Massachusetts Avenue corridor in Boston were noted most frequently and challenges with biking were highlighted. Congestion and safety issues around the interchange of I-93 and I-95 in Woburn and challenges with ongoing construction in Beverly were noted. Another notable cluster of comments in Northampton was observed, with many comments focusing on a lack of public transportation options in this area.

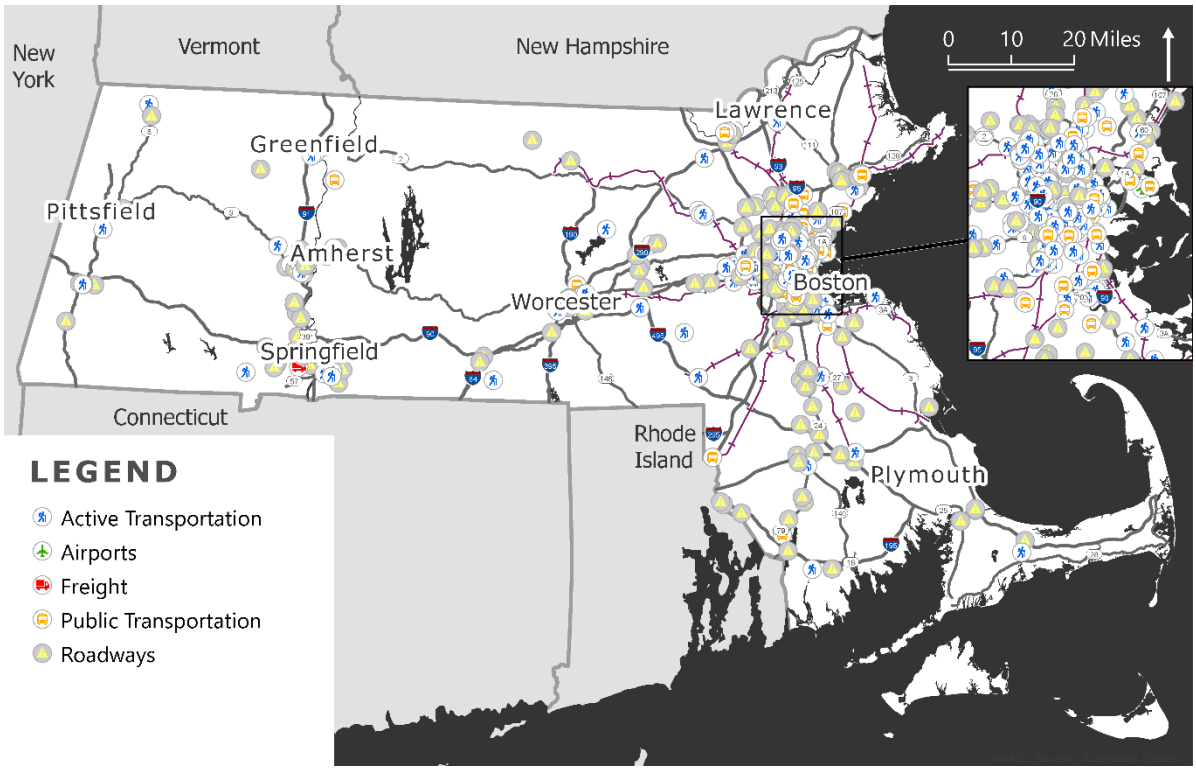
Figure 2.9 Clusters of Site-Specific Transportation Barriers Reported by Respondents



Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

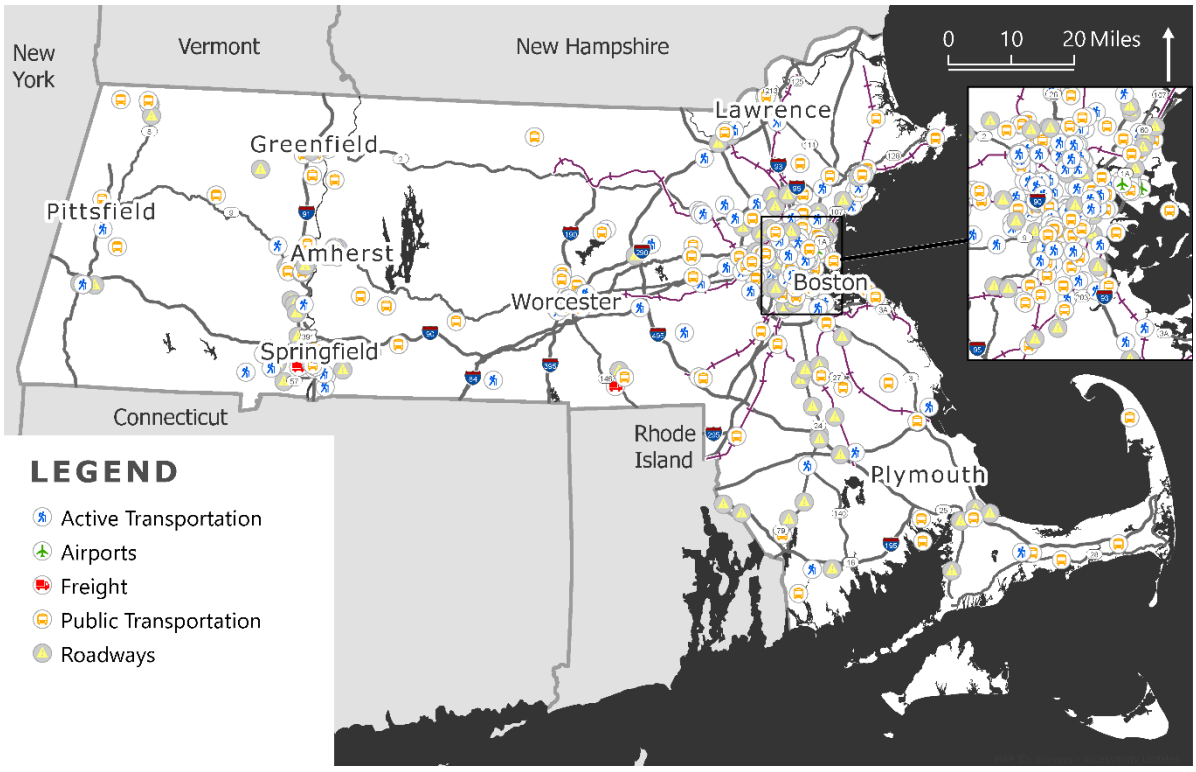
Respondents were asked to describe the problem they experience. More than half of the responses noted safety as a concern, with an emphasis on walking, bicycling, and roadways (Figure 2.10). Another common concern was connectivity, with over 400 responses (Figure 2.11). Finally, respondents raised nearly 80 resiliency concerns, with comments related to flooding of roadways, transit stations, and active transportation facilities (Figure 2.12).

Figure 2.10 Safety Site-Specific Transportation Needs Identified by Respondents



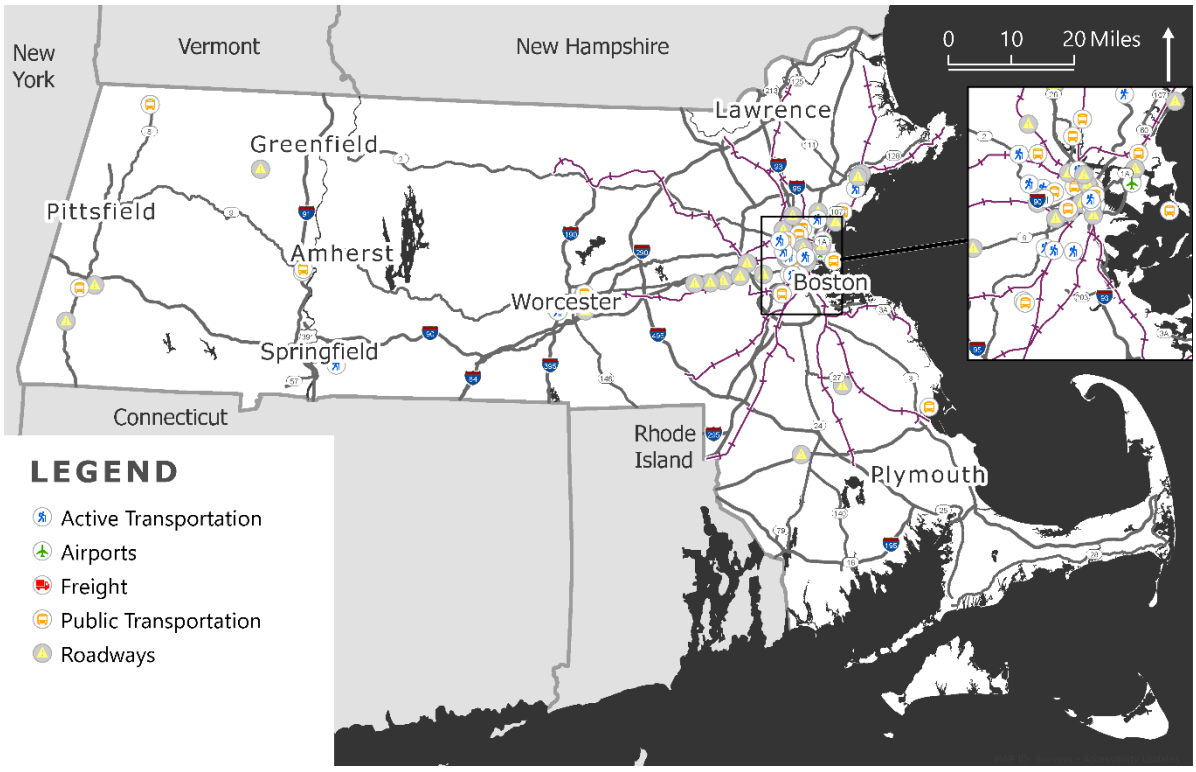
Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

Figure 2.11 Connectivity Site-Specific Transportation Needs Identified by Respondents



Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

Figure 2.12 Resiliency Site-Specific Transportation Needs Identified by Respondents



Source: Beyond Mobility Phase I Vision, Values, & Needs Survey, Summer 2022.

The previous plan reviewed inventory of existing transportation barriers and public engagement findings informed the data analysis described below and factored into developing the problem statements and overall *Beyond Mobility* Priority Areas.

3.0 Data Analysis

The Needs Assessment included an analysis of transportation data representative of each *Beyond Mobility* Priority Area. These data have been analyzed against social and geographic equity definitions to understand trends and inform and the definition of Problem Statements for each Priority Area.

3.1 Methodology

The Needs Assessment methodology was designed to better understand the transportation needs and barriers for a variety of different transportation users and communities. Key indicators were identified that align with each *Beyond Mobility* Priority Area and considered social and geographic equity definitions and, for some indicators, closeness to a public transit stop. The Needs Assessment key indicators were paired with the plan and policy review and public engagement findings to support the definition of Problem Statements for each *Beyond Mobility* Priority Area.

Defining Equity Areas of Focus

Through policies, practices, programs, and budgets, MassDOT has an opportunity to advance equitable access to safe, efficient, and affordable transportation systems across Massachusetts. Historically, transportation investment decisions have perpetuated inequities in communities such as Black, Latino, Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas or urban cores; and persons otherwise adversely affected by persistent poverty or inequality. Entrenched disparities have been embedded in the design of transportation planning and investment decision-making processes over time and *Beyond Mobility* is envisioning a variety of approaches to move towards transportation justice.

Acknowledging that transportation equity can be achieved only with intent and focus, MassDOT developed a definition of equity populations. This definition was used to understand how transportation needs and barriers vary across different communities. Building this understanding of how outcomes vary by communities, *Beyond Mobility* can highlight decision-making practices, intentional approaches, and actionable mechanisms, to strategically reduce harms and adverse impacts, and continuously increase equity in future transportation investments.

Equity Areas of Focus

To define equity areas of focus, *Beyond Mobility* used demographic data to identify areas with high concentrations of communities that experience disproportionate burdens resulting from the impacts of the transportation system. While referenced as “Environmental Justice communities” throughout Beyond Mobility, the specific definition of these equity areas of focus is Regional Environmental Justice “Plus” (REJ+), representing a holistic understanding of communities that are most impacted by transportation planning and decision-making. The *Beyond Mobility* Environmental Justice community designation is distinct from the traditional Environmental Justice definition in that it

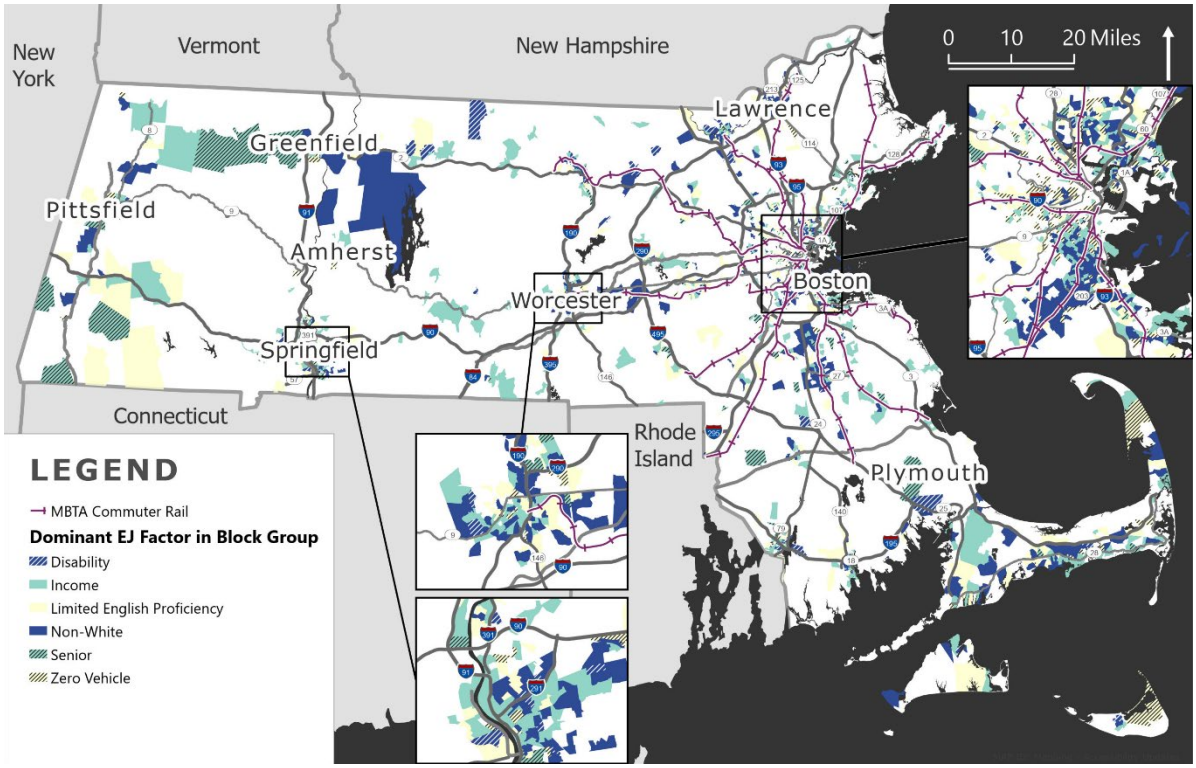
incorporates data on vehicle access, disability status, and age in addition to more traditional data on income, race, and limited English proficiency.

In addition to providing a more holistic and transportation-specific definition of equity, the Environmental Justice communities designation incorporations information on each Census block group's characteristics for each variable compared to the average of its MPO. This allows for a more localized understanding of equity, since statewide data is often skewed by larger metropolitan areas such as Boston. This differs from the traditional approach of comparing a block group's characteristics to statewide averages. For a community to be designated as Environmental Justice in this plan, it must have a higher concentration of these criteria than other communities in its region.

To be defined as an Environmental Justice community, a community must meet one of the following criteria:

- Higher concentration of poverty than in nearby communities
- Higher concentration of non-white households than in nearby communities
- Higher concentration of people with limited English proficiency than in nearby communities

Figure 3.1 Equity Areas of Focus, Most Dominant Equity Factor by Region



The following community characteristics were also factored into the Environmental Justice community definition to demonstrate which variable(s) were influencing the designation:

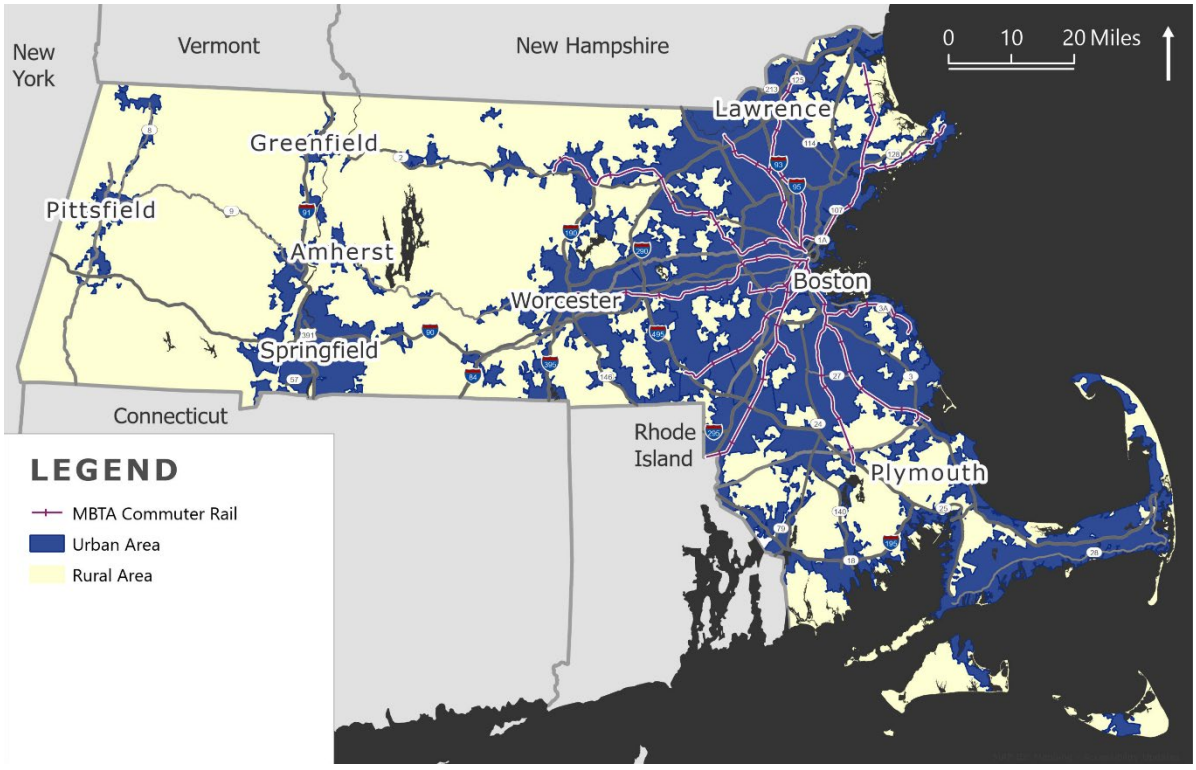
- Higher concentration of households without access to a vehicle than nearby communities

- Higher concentration of people with disabilities than nearby communities
- Higher concentration of people aged 65 years and over than nearby communities

Geographic Equity

Massachusetts Census block groups are organized into urban and rural areas. There are four types of urban areas: large urbanized area, small urbanized area, large urbanized cluster, and small urbanized cluster. In total, there are 21 urban areas in the state. If an area is not included in an urban region, it is considered rural. These urban and rural boundaries, shown in Figure 3.2, were used to understand how transportation needs and barriers vary across different parts of the state and to identify if users in urban or rural areas experience disproportionate burdens resulting from the impacts of the transportation system.

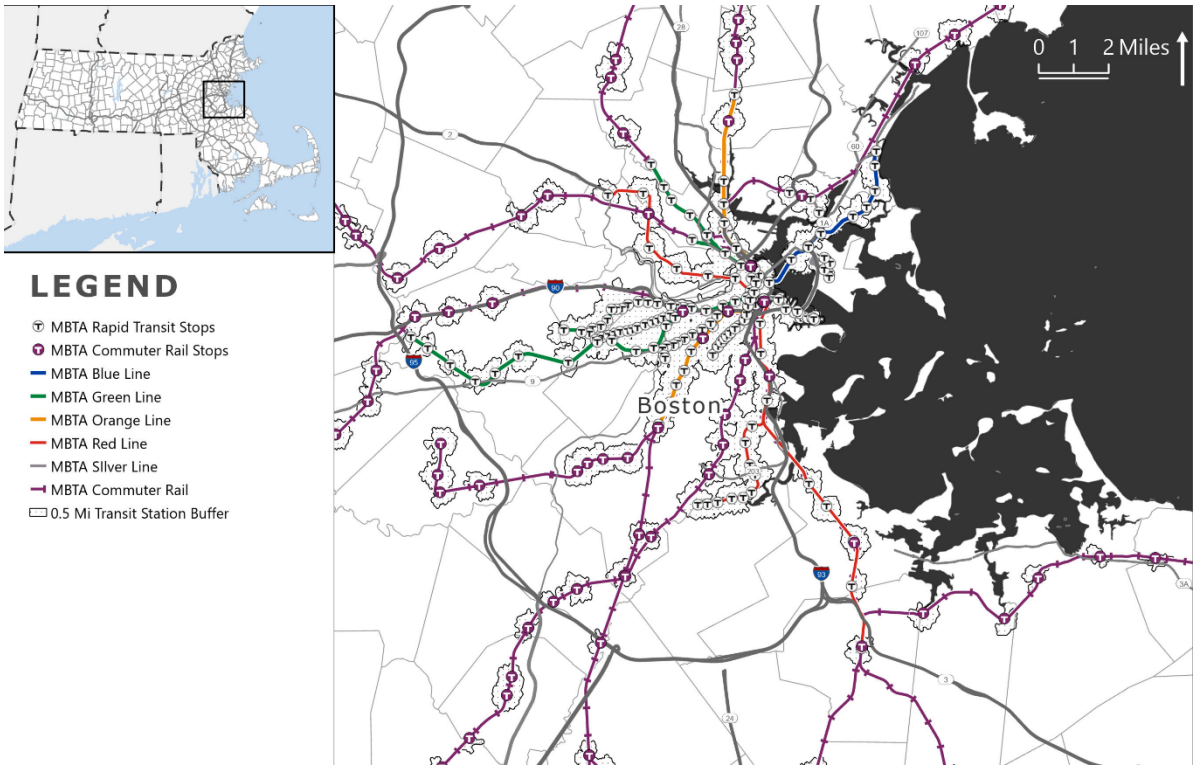
Figure 3.2 Urban and Rural Areas



Public Transit Access

For some analysis, the presence of an MBTA rapid transit or Commuter Rail station within one half and one mile was also considered, shown in Figure 3.3. This additional level of analysis was used to understand how transportation needs and barriers may be concentrated near access to transit and to identify if transit users experience disproportionate burdens resulting from impacts of the transportation system.

Figure 3.3 Public Transit Stations



3.2 Key Indicators

Publicly available data were used to develop indicators of transportation needs related to the *Beyond Mobility* Priority Areas: Safety, Access and Connectivity, Travel Experience, Reliability, and Resiliency. Table 3.1 presents a full list of the key indicators and associated data sources used in the analysis.

Table 3.1 Needs Assessment Key Indicators

Priority Area	Key Indicator	Description	Source and Source Link	Source Link
All	All	Data layers that apply to all analyses	Massachusetts State Boundary, MassGIS, 2020	MassGIS Data: State Outlines | Mass.gov
All	All	Data layers that apply to all analyses	Urban Area Centers (UACs), Census, 2020	https://data.census.gov/
All	All	Data layers that apply to all analyses	Environmental Justice Areas (REJ+, with and without Dominant Factor), MassGIS, 2023[1]	Not publicly available
All	All	Data layers that apply to all analyses	Block Groups—Decennial Census, Census, 2020	https://data.census.gov/
All	All	Data layers that apply to all analyses	Total Population, 2016-2020 5-Year American Community Survey (ACS)	https://data.census.gov/
Safety	Fatal & Serious Injury Crashes per Capita	Crashes occurring in the 2017 to 2019 timeframe that had a crash severity of "fatal" or "serious injury" per 1,000 capita.	MassDOT Crash Inventory, GeoDOT, 2017–2019	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2019-crash-level-details/about https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2018-crash-level-details/about https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2017-crashes/about
Safety	Fatal & Serious Injury Crashes by Jurisdiction and Functional Class	Crashes occurring in the 2017 to 2019 timeframe that had a crash severity of "fatal" or "serious injury," summarized by jurisdiction and functional class.	MassDOT Crash Inventory, GeoDOT, 2017–2019 MassDOT Road Inventory, GeoDOT, 2020	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2019-crash-level-details/about https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2018-crash-level-details/about https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2017-crashes/about https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::road-inventory-2020/about
Safety	Pedestrian Crashes per Capita	Crashes occurring in the 2017 to 2019 timeframe that had a non-motorist type of pedestrian per 1,000 capita.	MassDOT Crash Inventory, GeoDOT, 2017–2019	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2019-crash-level-details/about https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2018-crash-level-details/about https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2017-crashes/about
Safety	Pedestrian Crash Clusters per Capita	Multiple crashes involving pedestrians within 100 meters per 1,000 capita.	MassDOT Top Crash Locations, GeoDOT, 2010–2019	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2010-2019-hsip-pedestrian-cluster/about
Safety	Bicycle Crash Clusters per Capita	Multiple crashes involving bicyclists within 100 meters per 1,000 capita.	MassDOT Top Crash Locations, GeoDOT, 2010–2019	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::2010-2019-hsip-bicycle-cluster/about
Safety	Percentage of Speeding Roadway Risk Miles	Percentage of roadway miles identified as high risk with emphasis area as "Speeding."	MassDOT Crash Inventory, Network Screening Risk Based, 2013–2017	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::speed-aggressive-driving-risk-statewide-ranking-2013-2015/about
Safety	Percentage of Lane Departure Roadway Risk Miles	Percentage of roadway miles identified as high risk with emphasis area as "Lane Departure."	MassDOT Crash Inventory, Network Screening Risk Based, 2013–2017	https://massdot-impact-crashes-vhb.opendata.ArcGIS.com/datasets/MassDOT::roadway-departure-risk-mpo-ranking-2013-2017/about
Safety	Percentage of Bicycle Roadway Risk Miles	Percentage of roadway miles identified as high risk with emphasis area as "Bicyclist Related."	MassDOT Crash Inventory, Network Screening Risk Based, 2013–2017	https://massdot-impact-crashes-vhb.opendata.ArcGIS.com/datasets/MassDOT::bicycle-safety-risk-mpo-ranking-2013-2017/about
Safety	Percentage of Pedestrian Roadway Risk Miles	Percentage of roadway miles identified as high risk with emphasis area as "Pedestrian."	MassDOT Crash Inventory, Network Screening Risk Based, 2013–2017	https://massdot-impact-crashes-vhb.opendata.ArcGIS.com/datasets/MassDOT::pedestrian-safety-risk-statewide-ranking-2013-2017/about
Destination Connectivity	Potential for Walkable Trips	Latent demand for practical walking trips	GeoDOT, Potential for Walkable Trips, 2019	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::potential-for-walkable-trips-2022-update-2/about
Destination Connectivity	Potential for Bicycle Trips	Latent demand for practical bicycling trips	GeoDOT, Potential for Everyday Biking, 2019	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::potential-for-everyday-biking-2022-update-2/about
Destination Connectivity	Bicycle Facility Coverage	Statewide database of existing and planned bikeways.	GeoDOT, Bike Inventory, 2020	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::bike-inventory-2020/about
Destination Connectivity	Bicycle Share Coverage	Bike share locations.	Bluebikes,	https://member.bluebikes.com/map/, https://valleybike.org/[2]

Priority Area	Key Indicator	Description	Source and Source Link	Source Link
Destination Connectivity	Sidewalk Gaps	Sidewalk width filter in Road Inventory file.	MassDOT Road Inventory, GeoDOT, 2020	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::road-inventory-2020/about
Travel Experience	Pavement Condition	Segment with pavement condition of "Poor" or "Fair."	GeoDOT, Pavement Condition, 2020	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::pavement-condition-2020/about
Travel Experience	Bridge Condition	Bridge with condition of "Structurally Deficient."	GeoDOT, Bridges, 2022	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::bridges/about
Travel Experience	Curb Ramps	Curb ramp with condition of "Deficient"	GeoDOT, Pedestrian Curb Cuts, 2018	https://geo-massdot.opendata.ArcGIS.com/datasets/MassDOT::pedestrian-curb-cuts/about
Reliability	Congestion	Relationship of roadway segment where 70th percentile speed is slower than free flow speed.	RITIS, Inrix March 2022 to February 2023	Not publicly available.
Reliability	Planning Time Index	Comparison of 95th percentile speed and free flow speed to determine reliability of segment.	RITIS, Inrix March 2022 to February 2023	Not publicly available.
Resiliency	Sea Level Rise	Potential sea level rise inundation of coastal areas from a projected 1 to 10 feet rise in sea level.	MassGIS, NOAA Sea Level Rise, 2019	https://www.mass.gov/info-details/massgis-data-noaa-sea-level-rise
Resiliency	Hurricane Inundation Zone	Hurricane Surge Inundation areas for Category 1 through 4 striking the coast of Massachusetts.	MassGIS, Hurricane Surge Inundation Zones, 2013	https://www.mass.gov/info-details/massgis-data-hurricane-surge-inundation-zones

[1] *The Beyond Mobility Environmental Justice community designation is distinct from the traditional Environmental Justice definition in that it incorporates data on vehicle access, disability status, and age in addition to income, race, and limited English proficiency. It also compares each Census block group's characteristics for each variable to the average of its MPO region rather than statewide averages.*

[2] *ValleyBike program did not operate in 2023. It is expected that this program will resume Spring 2024.*

Note: Per capita is based on the number of people residing in the specific community (block group, REJ+, non-REJ+, Urban, or Rural).

3.3 Findings

The analysis identified trends relating to each *Beyond Mobility* Priority Area.

Safety

The safety analysis investigated data such as crash history, high-crash location areas, and top crash risk sites to gain an understanding of safety related challenges across the Commonwealth. These data were screened to identify inequalities based on geography and demographics as well as proximity to transit stations.

The resulting safety analysis demonstrated that historically marginalized communities experience fatal and serious injury collisions at a higher rate than other communities. This is especially true for crashes that involved a pedestrian and/or a bicyclist. Rural communities have a slightly higher rate of fatal/serious injury crashes per capita than urban communities. However, urban communities have significantly higher pedestrian or bicycle crash rates per capita than rural communities.

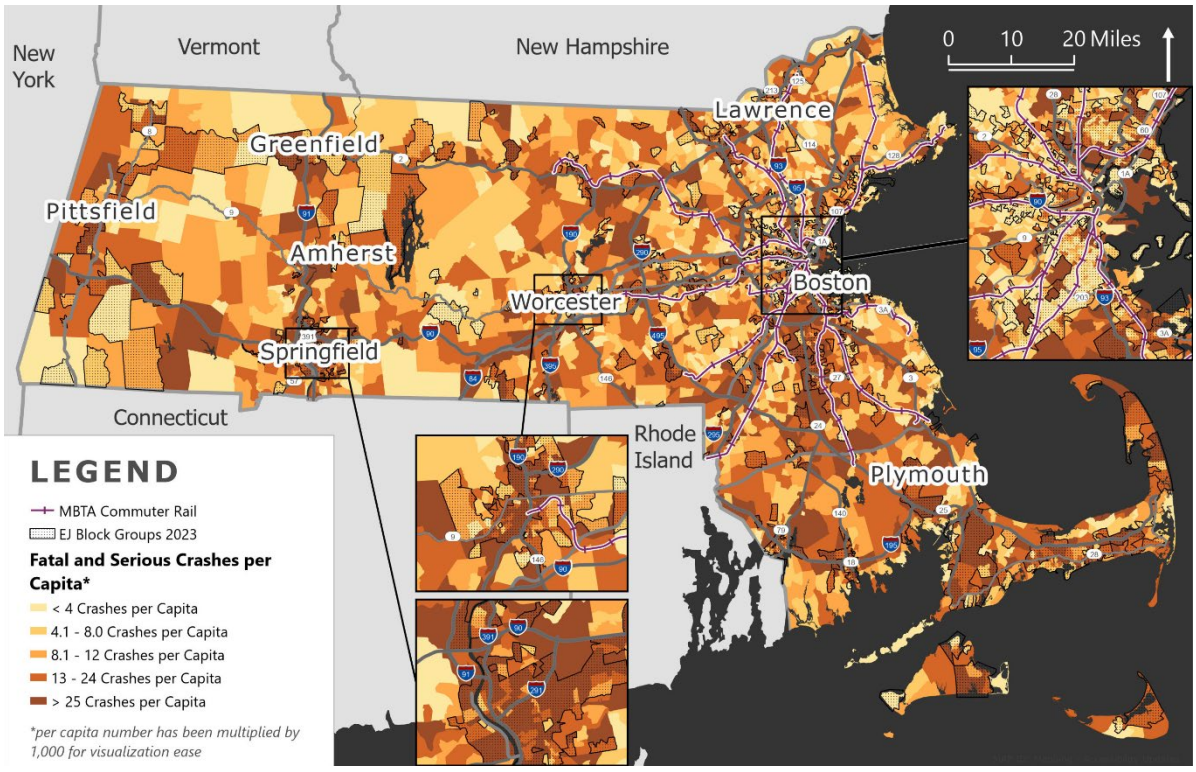
Roadways—Fatal & Serious Crashes

Vehicle crashes in Massachusetts are reported to the RMV and summarized by MassDOT. MassDOT data for crashes that resulted in a fatality or severe injury from 2017–2019 were reviewed to identify trends and screened to identify inequalities based on geography and demographics. In addition, the analysis included a comparison of roadway jurisdiction and functional classification. The analysis showed that:

- Massachusetts statewide has on average 4.99 fatal or serious crashes per 1,000 capita per year.
- Environmental Justice communities 1.25 times the fatal or serious crashes per capita than non-Environmental Justice communities.
- Rural communities have 1.06 times the fatal or serious crashes per capita than urban communities.
- Communities with concentrations of populations with a disability, low-income households, and/or senior households have the highest fatal/serious crash per capita of Environmental Justice communities.

As indicated above, Environmental Justice communities experience a higher rate of fatal or serious injury crashes per capita than non-Environmental Justice communities. Figure 3.4 illustrates the prevalence of fatal and serious injury crashes and Environmental Justice (REJ+) areas.

Figure 3.4 Fatal and Serious Injury Crashes (2017-2019), Environmental Justice



Source: 2016-2020 5-Year ACS, MassDOT Crash Data 2017-2019.

MassDOT-owned roadways make up approximately eight percent of roadways statewide. However, about 31 percent of fatal or serious injury crashes occurred on MassDOT-owned roadways (Table 3.2).[1]

Table 3.2 Jurisdiction of Crashes (2017–2019)

Jurisdiction	Total Fatal/Serious Injury Crashes	Percent of Total
MassDOT Owned	31,937	31%
Other Ownership	70,929	69%

Interstates make up approximately two percent of all roadways in Massachusetts. However, nearly nine percent of fatal or serious injury crashes occurred on Interstates, as show in Table 3.3. Conversely, local roads make up 68 percent of all roadways and only experience about 11 percent of fatal/serious injury crashes. MassDOT's crash reports indicate that speeding may be a factor in the prevalence of fatal and serious injury crashes along interstates and arterials. According to the 2021 report, nearly 50 percent of exceeding speed crashes of any severity occurred on arterials.[2]

1 Road Inventory Year-End Report 2020, MassDOT Office of Transportation Planning. https://www.mass.gov/doc/2020-road-inventory-year-end-report/download, July 19, 2023.

2 MassDOT IMPACT Phase II – Identification of Risk Factors for SHSP Emphasis Areas (Speeding and Aggressive Driving); VHB for MassDOT; August 2021.

Table 3.3 Functional Class of Crashes (2017–2019)

Classification	Total Fatal/Serious Injury Crashes	Percent of Total
Interstate	8,842	8.60%
Local	11,204	10.89%
Rural minor arterial/urban principal arterial	26,026	25.30%
Rural or urban principal arterial	11,014	10.71%
Urban collector or rural minor collector	10,267	9.98%
Urban minor arterial or rural major collector	31,760	30.88%
Null/Other	3,753	3.65%

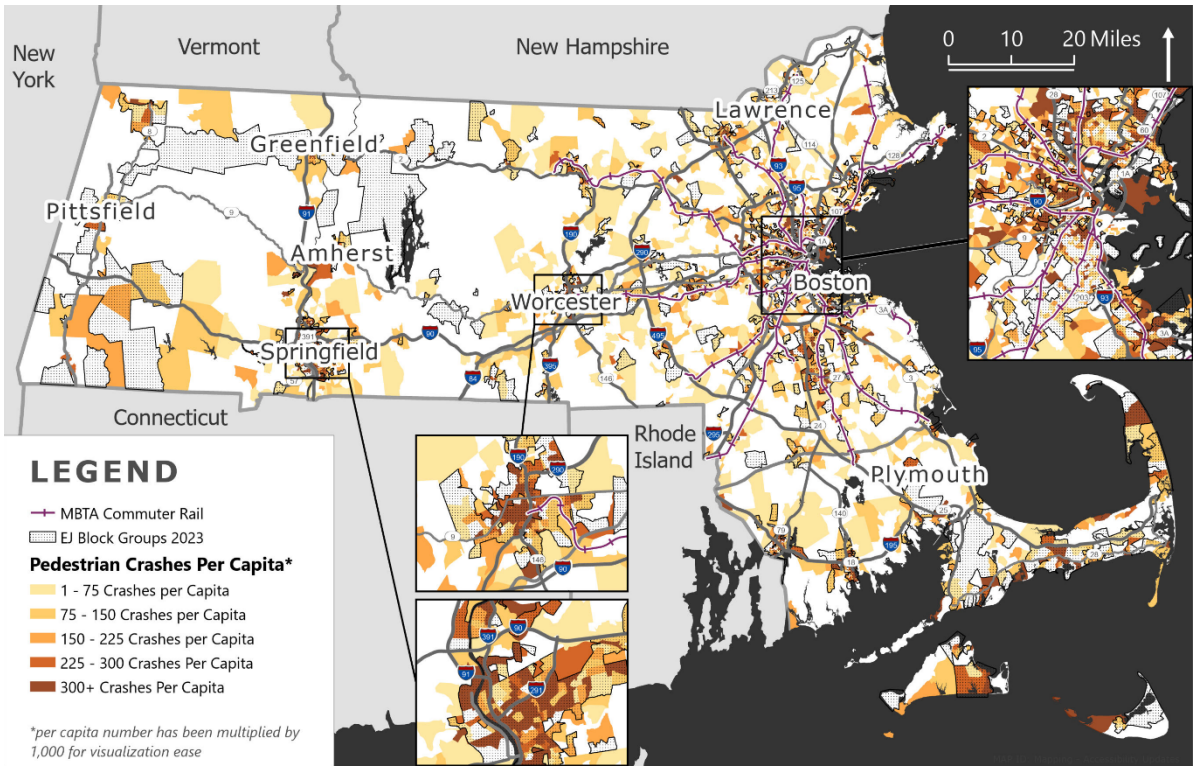
Active Transportation—Pedestrian Crashes & Crash Clusters

MassDOT data for crashes that involved pedestrians from 2017-2019 were reviewed. An additional step that MassDOT takes with crash data is to define crash clusters based on distance to nearby crashes. Pedestrian crashes within 100 meters of each other are grouped into a pedestrian crash cluster. The top 10 percent of clusters for each MPO is included in the statewide crash cluster list and ranked by crash severity. MassDOT data for pedestrian crashes and pedestrian crash clusters were reviewed to identify trends and screened to identify inequalities based on geography and demographics. The analysis showed that:

- Environmental Justice communities have 1.72 times the pedestrian crashes per capita than non-Environmental Justice communities.
- Environmental Justice communities have 7.08 times the pedestrian crash cluster area per capita than non-Environmental Justice communities.
- Environmental Justice communities have 20 times the number of pedestrian crash clusters per square mile than non-Environmental Justice communities.
- Urban communities have 4.47 times the pedestrian crashes per capita than rural communities.
- Urban communities have nearly 10,000 times the pedestrian crash cluster area per capita than rural communities.
- Among Environmental Justice groups, communities with concentrations of zero-vehicle households and low-income households have the highest pedestrian crash cluster area per capita.

As indicated above, Environmental Justice communities experience a higher rate of pedestrian crashes per capita than non-Environmental Justice communities. Similarly, urban communities experience a higher rate of pedestrian crashes per capita than rural communities. Figure 3.5 illustrates pedestrian crashes per capita, with the Environmental Justice overlay.

Figure 3.5 Pedestrian Crashes per Capita, Environmental Justice Communities



Source: 2016–2020 5-Year ACS, MassDOT HSIP Pedestrian Crash Cluster Data 2010-2019.

Active Transportation—Bicycle Crashes & Crash Clusters

MassDOT data for crashes that involved bicyclists from 2017–2019 were reviewed. Additionally, similar to pedestrian crash clusters, MassDOT evaluates bicycle crash clusters. The bicycle crash cluster analysis is done in the same manner as the pedestrian crash cluster approach. MassDOT data for bicycle crashes and bicycle crash clusters were reviewed to identify trends and screened to identify inequalities based on geography and demographics. The analysis showed that:

- Environmental Justice communities have 1.10 times the bicycle crashes per capita than non-Environmental Justice communities.
- Environmental Justice communities have 7.32 times the bicycle crash cluster area per capita than non-Environmental Justice communities.
- Environmental Justice communities have 14.4 times the bicycle crash clusters per square mile than non-Environmental Justice communities.
- Urban communities have 2.57 times the bicycle crashes per capita than rural communities.
- Urban communities have 356 times the bicycle crash cluster area per capita than rural communities.

- Among Environmental Justice groups, communities with concentrations of zero-vehicle households and low-income households have the highest bicycle crash cluster area per capita.

As indicated above, Environmental Justice communities experience a higher rate of bicycle crashes per capita than non-Environmental Justice communities. Similarly, urban communities experience a higher rate of bicycle crashes per capita than rural communities.

Multimodal—Roadway Risk

In addition to crash-based screening, MassDOT also uses risk-based analysis. This analysis identifies locations with the highest risk of fatal and serious injury crashes for a number of emphasis areas of the *MassDOT Strategic Highway Safety Plan*. The Needs Assessment analysis considered the speeding, lane departure, bicycle, and pedestrian emphasis areas. In addition, a composite analysis of "total risk" was developed. MassDOT data for roadway risk were reviewed to identify trends and screened to identify inequalities based on geography and demographics. The analysis showed that:

Total Risk

- Environmental Justice communities have 1.96 times the percentage of total risk miles than non-Environmental Justice communities.
- Rural communities have 1.03 times the percentage of total risk miles than urban communities.
- Among Environmental Justice groups, communities with concentrations of zero-vehicle households and low-income households have the highest percentage of total risk miles.

As indicated above, Environmental Justice communities experience a higher rate of total risk miles per capita than non-Environmental Justice communities. Similarly, urban communities experience a higher rate of total risk miles per capita than rural communities.

Speeding

- Environmental Justice communities have 1.29 times the percentage of speeding risk miles than non-Environmental Justice communities.
- Urban communities have 1.06 times the percentage of speeding risk miles than rural communities.
- Among Environmental Justice groups, communities with concentrations of low-income households and minority households have the highest percentage of speeding risk miles.

As indicated above, Environmental Justice communities experience a higher rate of speeding risk miles per capita than non-Environmental Justice communities. Similarly, urban communities experience a higher rate of speeding risk miles per capita than rural communities.

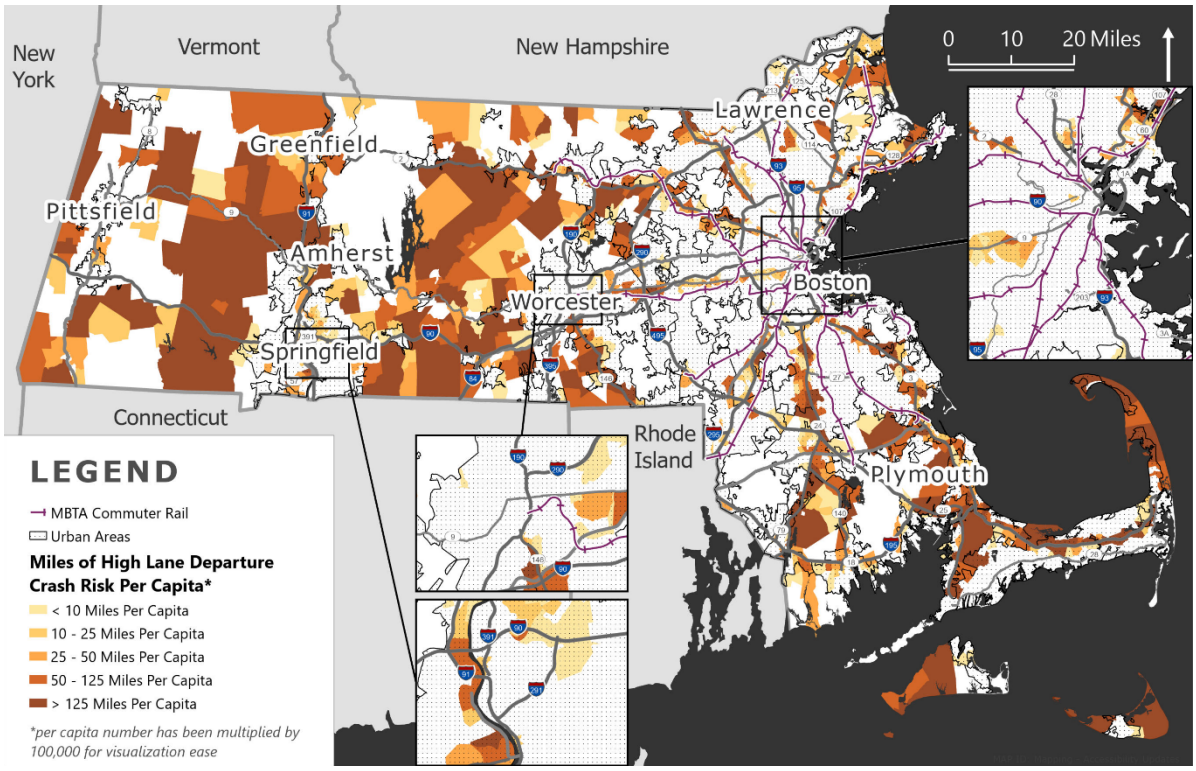
Lane Departures

- Non-Environmental Justice communities have 1.33 times the percentage of lane departure risk miles than Environmental Justice communities.
- Rural communities have 2.61 times the percentage of lane departure risk miles than urban communities.
- Among Environmental Justice groups, communities with concentrations of zero-vehicle households, low-income households, and limited English proficient households have the highest percentage of lane departure risk miles.

As indicated above, non-Environmental Justice communities experience a higher rate of lane departure risk miles per capita than Environmental Justice communities. Similarly, rural communities experience a higher rate of lane departure risk miles per capita than urban communities.

Figure 3.6 illustrates roadway miles at high risk for lane departure per capita and urban and rural areas.

Figure 3.6 Roadway Miles at High Risk for Lane Departure per Capita, Urban/Rural



Source: 2016–2020 5-Year ACS, MassDOT IMPACT Roadway Departure Safety Risk MPO Ranking 2013–2017.

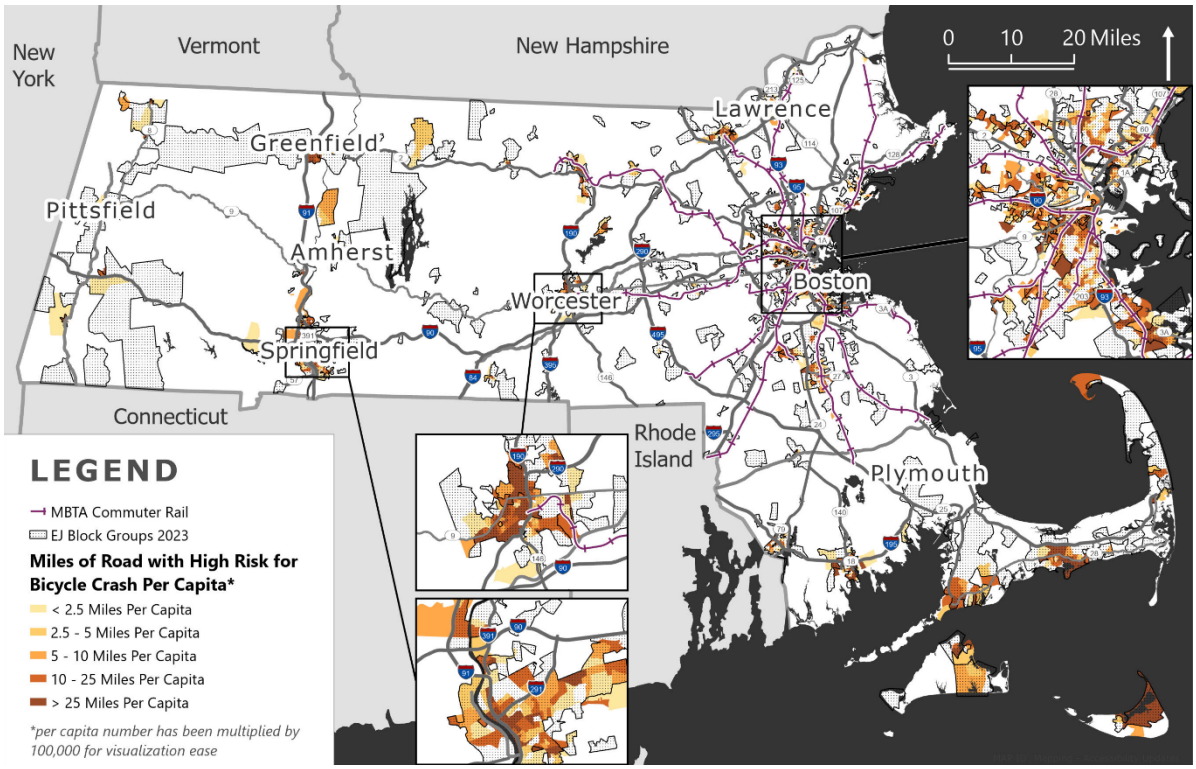
Bicyclist Related Risk

- Environmental Justice communities have 13.7 times the percentage of bicycle-related risk miles than non-Environmental Justice communities.
- Urban communities have 83.7 times the percentage of bicycle-related risk miles than rural communities.
- Among Environmental Justice groups, communities with concentrations of zero-vehicle households and low-income households have the highest percentage of bicycle-related risk miles.

As indicated above, Environmental Justice communities experience a higher rate of bicycle-related risk miles per capita than non-Environmental Justice communities. Similarly, urban communities experience a higher rate of bicycle-related risk miles per capita than rural communities.

Figure 3.7 illustrates roadway miles at high risk for bicycle-related crashes per capita and Environmental Justice communities.

Figure 3.7 Roadway miles at High Risk for Bicycle Crashes per Capita, Environmental Justice Communities



Source: 2016–2020 5-Year ACS, MassDOT IMPACT Bicyclist Safety Risk MPO Ranking 2013–2017.

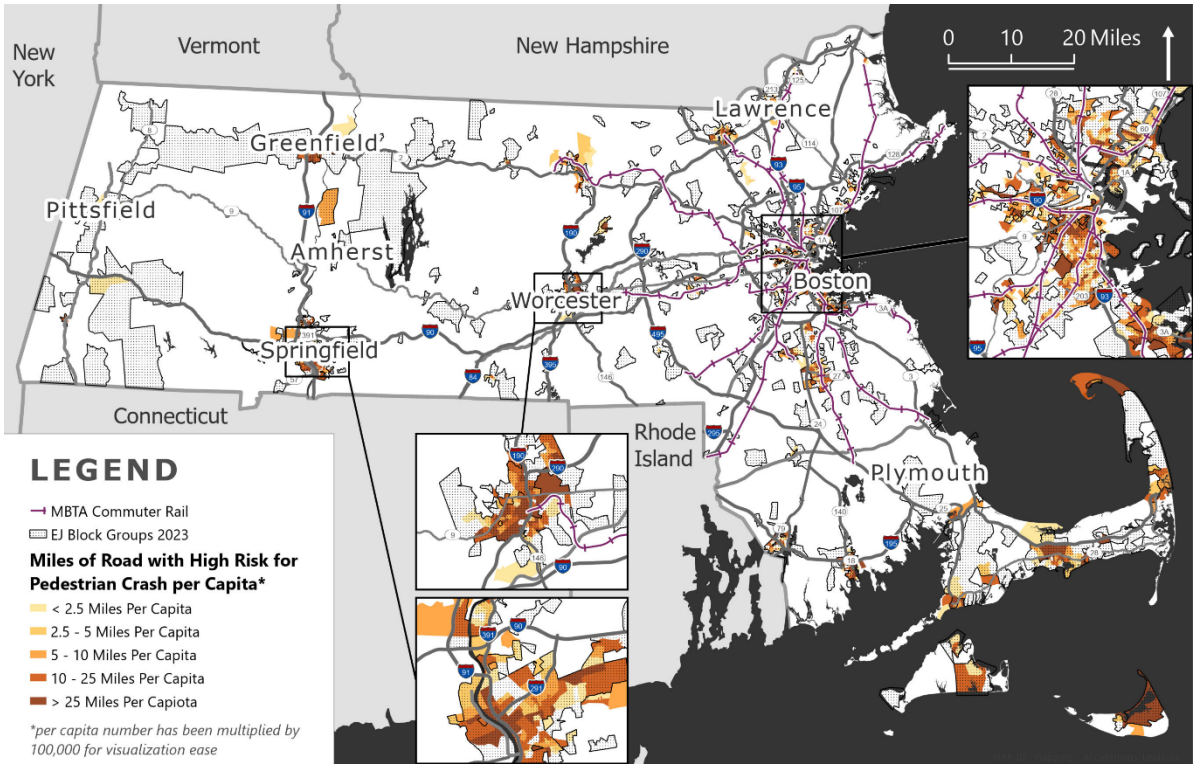
Pedestrian Risk

- Environmental Justice communities have 18.4 times the percentage of pedestrian risk miles than non-Environmental Justice communities.
- Urban communities have 108.5 times the percentage of pedestrian risk miles than rural communities.
- Among Environmental Justice groups, communities with concentrations of zero-vehicle households and low-income households have the highest percentage of pedestrian risk miles.

As indicated above, Environmental Justice communities experience a higher rate of Pedestrian Risk miles per capita than non-Environmental Justice communities. Similarly, urban communities experience a higher rate of Pedestrian Risk miles per capita than rural communities.

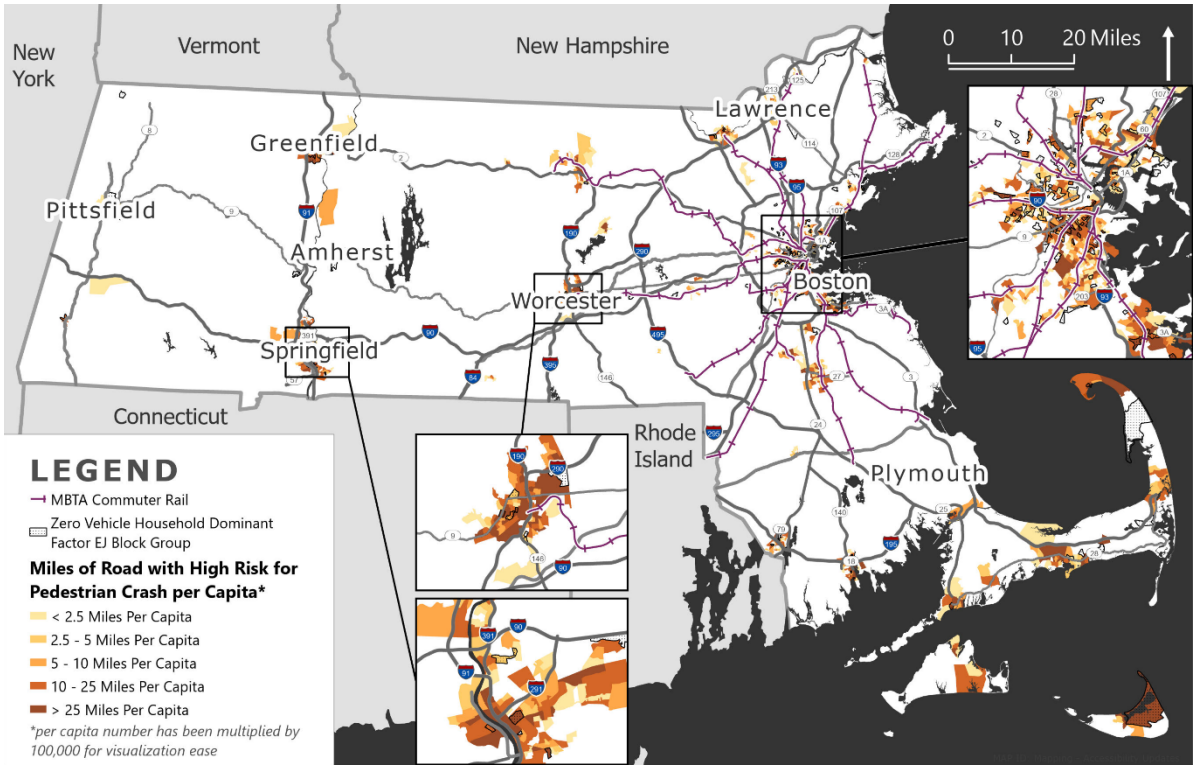
Figure 3.8 illustrates roadway miles at high risk for pedestrian crashes per capita, with the Environmental Justice overlay. Figure 3.9 illustrates roadway miles at high risk for pedestrian crashes per capita, with the Environmental Justice overlay highlighting the most dominant factor of zero-vehicle households.

Figure 3.8 Roadway Miles at High Risk for Pedestrian Crashes per Capita, Environmental Justice



Source: 2016–2020 5-Year ACS, MassDOT IMPACT Pedestrian Safety Risk MPO Ranking 2013–2017.

Figure 3.9 Roadway Miles at High Risk for Pedestrian Crashes per Capita, Environmental Justice (Zero-Vehicle Household-MDF)



Source: 2016–2020 5-Year ACS, MassDOT IMPACT Pedestrian Safety Risk MPO Ranking 2013–2017, REJ+ Most Dominant Factor—Zero-Vehicle Households.

Destination Connectivity

The destination connectivity analysis investigated data such as the extent of bicycle and pedestrian facilities across the state and MassDOT's analysis of potential for walkable trips and potential for everyday biking. These analyses helped frame an understanding of the availability of active transportation elements across the Commonwealth and where there is potential for more walking and biking trips. These data were also screened to identify inequalities based on geography and demographics as well as proximity to transit stations.

The analysis demonstrated that traditionally marginalized communities have a higher potential for walking and bicycling than other communities even though these communities have fewer existing and planned bicycle facilities. Rural communities have more bike facilities per capita than urban communities, even though urban communities have a higher rate of potential miles for bicycle trips.

Active Transportation—Potential for Walkable Trips

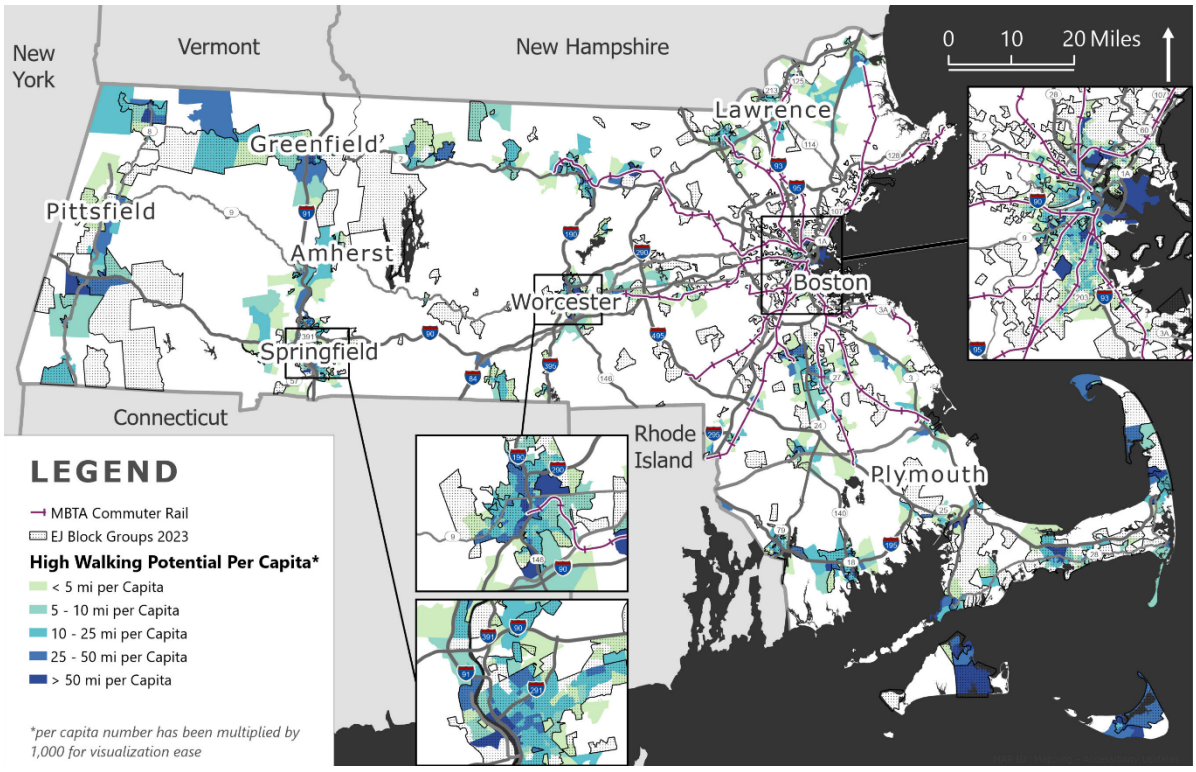
MassDOT has developed an analysis to estimate the potential demand for pedestrian activity throughout the Commonwealth roadway network based on access to destinations—such as schools, parks, shopping, or transit—and proximity to reported pedestrian crashes. Roadways with a high

potential demand for walkable trips were reviewed to identify trends and screened to identify inequalities based on geography and demographics. In addition, the analysis included a review of the relationship of high potential roadways in proximity of transit stops/stations. The analysis showed that:

- Environmental Justice communities have 5.92 times the percentage of high potential for walkable trips miles than non-Environmental Justice communities.
- Urban communities have 2.1 times the total potential for walkable trips miles than rural communities, but 28.3 times the high potential for walkable trips miles.
- Communities with concentrations of zero-vehicle households and low-income households have the highest percentage of high potential for walkable trips miles of Environmental Justice communities.
- Environmental Justice communities have nearly 1.34 times higher percentage of high potential for walkable trips miles than non-Environmental Justice communities within half a mile of MBTA rapid transit stations.
- Environmental Justice communities have nearly 2.55 times higher percentage of high potential for walkable trips miles than non-Environmental Justice communities within half a mile of MBTA Commuter Rail stations.

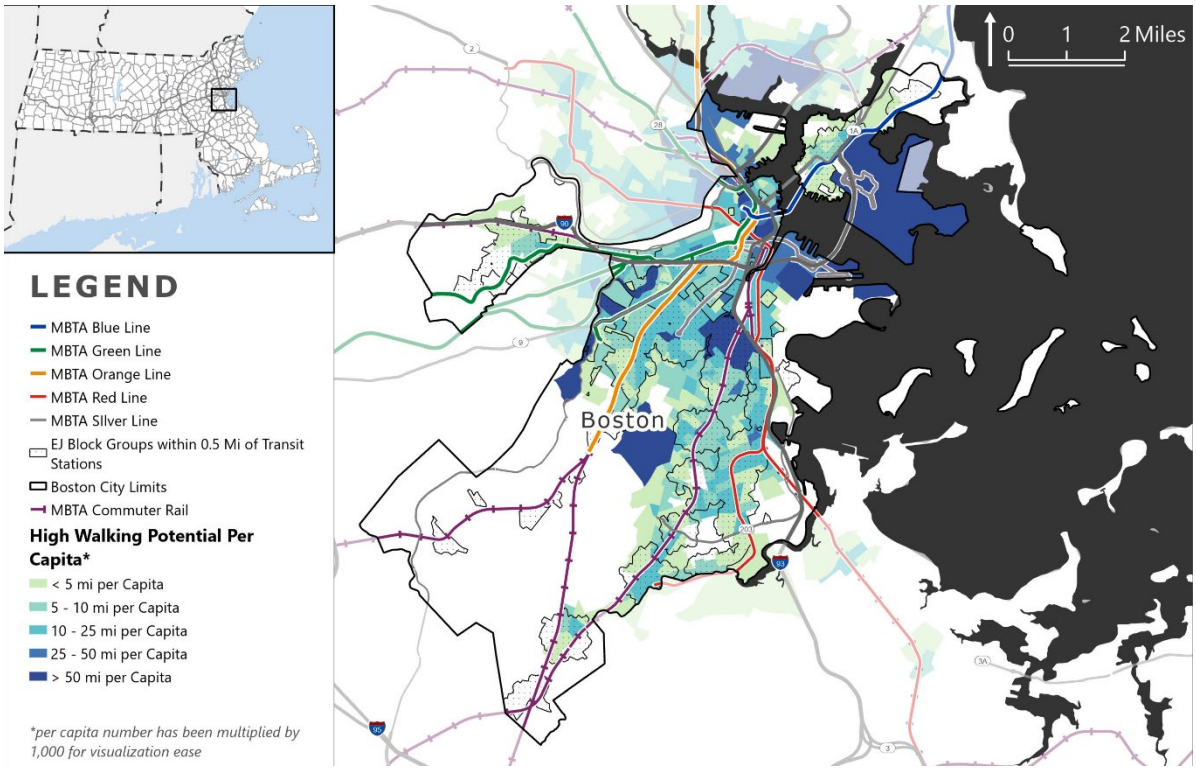
As indicated above, Environmental Justice communities experience a higher rate of High Potential for Walkable Trips per capita in general and in proximity to transit stops or stations compared with non-Environmental Justice communities. Figure 3.10 illustrates the high potential for walkable trips per capita. Figure 3.11 illustrates the high potential for walkable trips per capita and the location of transit stations.

Figure 3.10 High Potential for Walkable Trips per Capita



Source: 2016-2020 5-Year ACS, MassDOT Potential for Walking 2022.

Figure 3.11 High Potential for Walking per Capita, Transit Buffer



Source: 2016–2020 5-Year ACS, MassDOT Potential for Walking 2022, MBTA Transit Stops.

Active Transportation—Potential for Everyday Biking

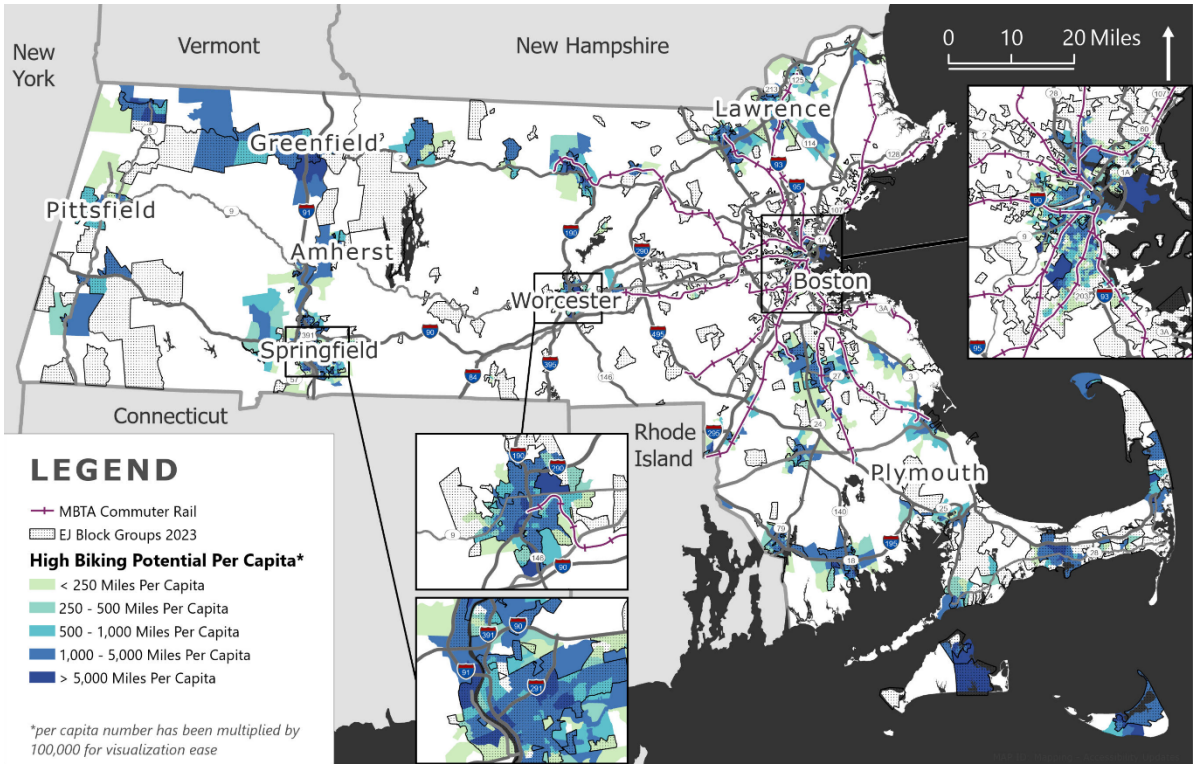
In addition to walkable trips, MassDOT has evaluated the potential demand for bicycle trips throughout the Commonwealth. Roadways with a high potential demand for everyday biking were reviewed to identify trends and screened to identify inequalities based on geography and demographics. In addition, the analysis included a review of the relationship of high potential roadways in the proximity of transit stops/stations. The analysis showed that:

- Environmental Justice communities have 5.92 times the percentage of high potential for everyday biking miles compared to non-Environmental Justice communities.
- Urban communities have 2.1 times the total potential for everyday biking miles compared to rural communities but 35.7 times the high potential for everyday biking miles.
- Among Environmental Justice groups, communities with concentrations of zero-vehicle households, LEP households, and low-income households have the highest percentage of high potential for everyday biking miles of Environmental Justice communities.
- Environmental Justice communities have nearly 1.13 times the potential for everyday biking miles than non-Environmental Justice communities within half a mile of MBTA rapid transit stations.

- Environmental Justice communities have nearly 2.62 times the potential for everyday biking miles than non-Environmental Justice communities within half a mile of commuter rail stations.

As indicated above, Environmental Justice communities experience a higher rate of high potential for everyday biking per capita in general and in proximity to transit stops/stations than non-Environmental Justice communities. Figure 3.12 illustrates the high potential for everyday biking per capita and the Environmental Justice (REJ+) overlay.

Figure 3.12 High Potential for Everyday Biking per Capita, Environmental Justice



Source: 2016–2020 5-Year ACS, MassDOT Potential for Everyday Biking 2022.

Active Transportation—Bicycle Facilities Coverage

MassDOT maintains a statewide inventory of existing and planned bicycle facilities. Table 3.4 shows the existing and planned length of bicycle facilities by type.

Table 3.4 Bicycle Facility Coverage

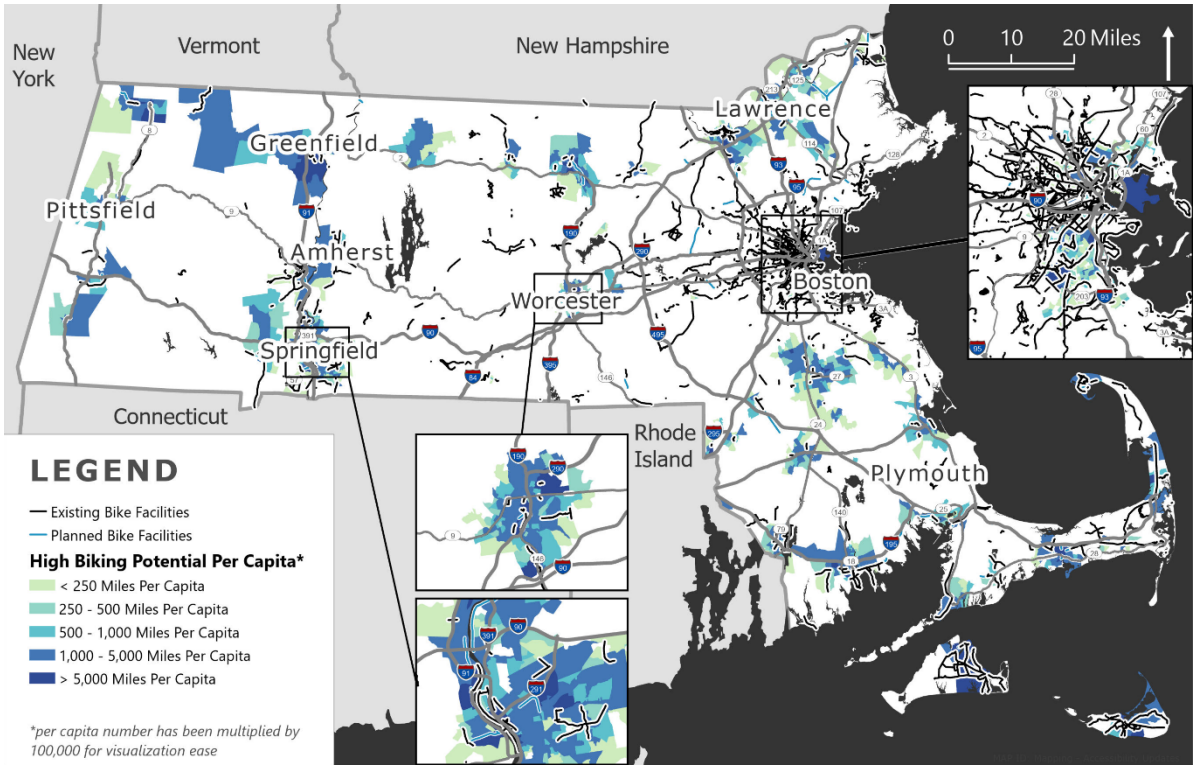
Facility Type	Total Existing Miles	Total Planned Miles	Total Miles	Share
Bike Lane	478.43	2.73	481.16	33%
Cycle Track/Separated Bike Lane	29.53	3.57	33.10	2%
Shared Use Path	844.31	101.96	946.27	65%
Bicycle/Pedestrian Priority Roadway	2.46	0.00	2.46	0%
Other	0.11	0.00	0.11	0%

The existing and planned bicycle facilities were reviewed to identify trends and screened to identify inequalities based on geography and demographics. In addition, the analysis included a review of the relationship of high potential roadways in the proximity of transit stops/stations. The analysis showed that:

- Non-Environmental Justice communities have 1.22 times the existing bike facilities and 1.02 times the planned bike facilities per capita than Environmental Justice communities.
- Rural communities have 3.01 times the miles of existing bike facilities per capita than urban communities; rural communities also have and 1.99 times the miles of planned bike facilities per capita than urban communities.
- Urban communities have 1.6 times the miles of existing bike facilities and 2.42 times the mileage of planned bike facilities as a percentage of total roadway miles than rural communities.
- Communities with concentrations of minority populations and low-income households have the least existing bike infrastructure per capita of Environmental Justice communities.
- Communities with concentrations of LEP populations and zero-vehicle households have the fewest planned bike facilities per capita of Environmental Justice communities.

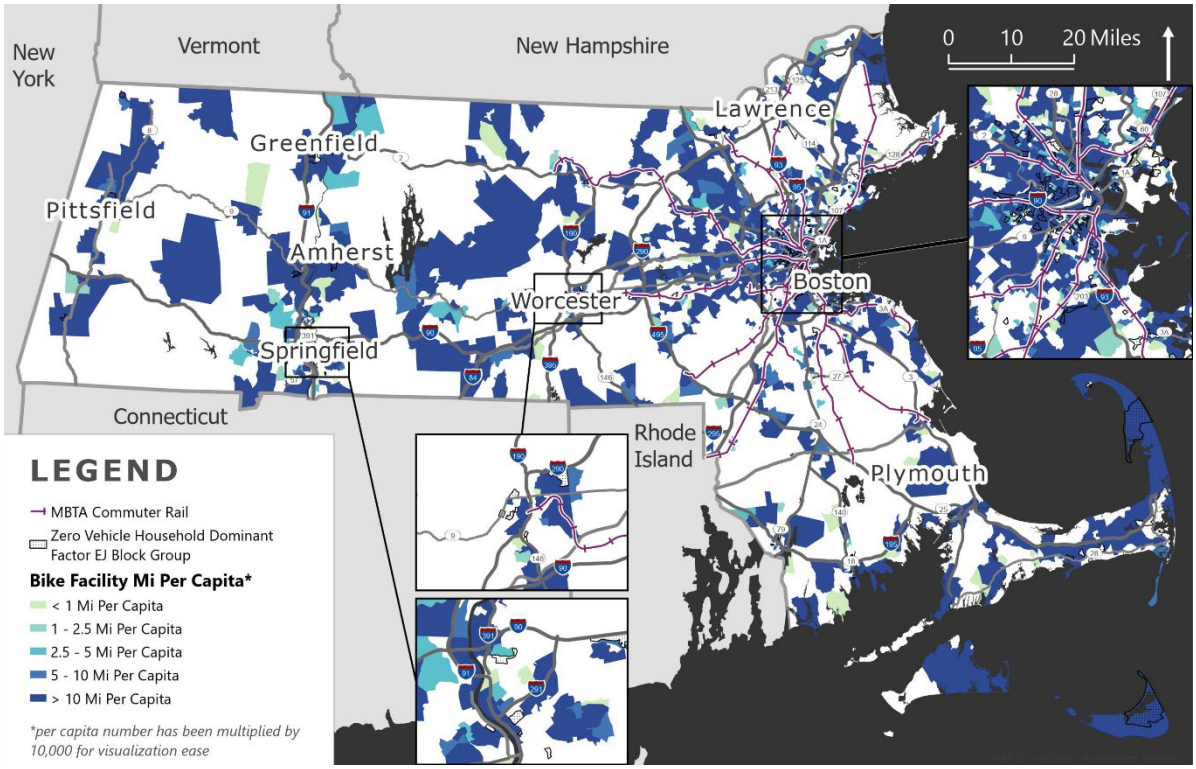
As indicated above, non-Environmental Justice communities have more bike facilities (existing and planned) per capita than Environmental Justice communities. Similarly, rural communities have more bike facilities (existing and planned) per capita than urban communities. Figure 3.13 illustrates high potential for everyday bicycling per capita and the location of Environmental Justice communities and bicycle facilities (existing and planned). Figure 3.13 illustrates the existing and planned bicycle facilities per capita, with Environmental Justice block groups where the most dominant factor is zero-vehicle households highlighted in Figure 3.14.

Figure 3.13 High Potential for Everyday Biking per Capita, Environmental Justice Communities, and Existing and Planned Bicycle Facilities



Source: 2016–2020 5-Year ACS, MassDOT Potential for Everyday Biking 2022, MassDOT Bike Inventory 2020.

Figure 3.14 Existing and Planned Bicycle Facilities per Capita, Environmental Justice Communities (Zero-Vehicle Household-MDF)



Source: 2016–2020 5-Year ACS, MassDOT Bike Inventory 2020.

Active Transportation—Bicycle Share Coverage

Two bike share companies (Bluebikes and ValleyBike) operate in Massachusetts. Bike share locations were mapped to identify trends and screened to identify inequalities based on geography and demographics. In addition, the analysis included a review of the bike share locations in the proximity of transit stations. The analysis showed that:

- Environmental Justice communities have 1.92 times the bike share stations per capita than non-Environmental Justice communities.
- Rural communities have three bike share stations, while urban communities have over 500 bike share stations.
- Urban communities have 16.4 the bike stations per capita than rural communities.
- Approximately 82 percent of MBTA rapid transit stations within Environmental Justice communities have bike share stations, compared to 77 percent stations within non-Environmental Justice communities.
- Approximately 18 percent of MBTA Commuter Rail stations have bike share stations.

As indicated above, Environmental Justice communities have more bike share locations per capita than non-Environmental Justice communities. Similarly, urban communities have more bike share locations per capita than rural communities.

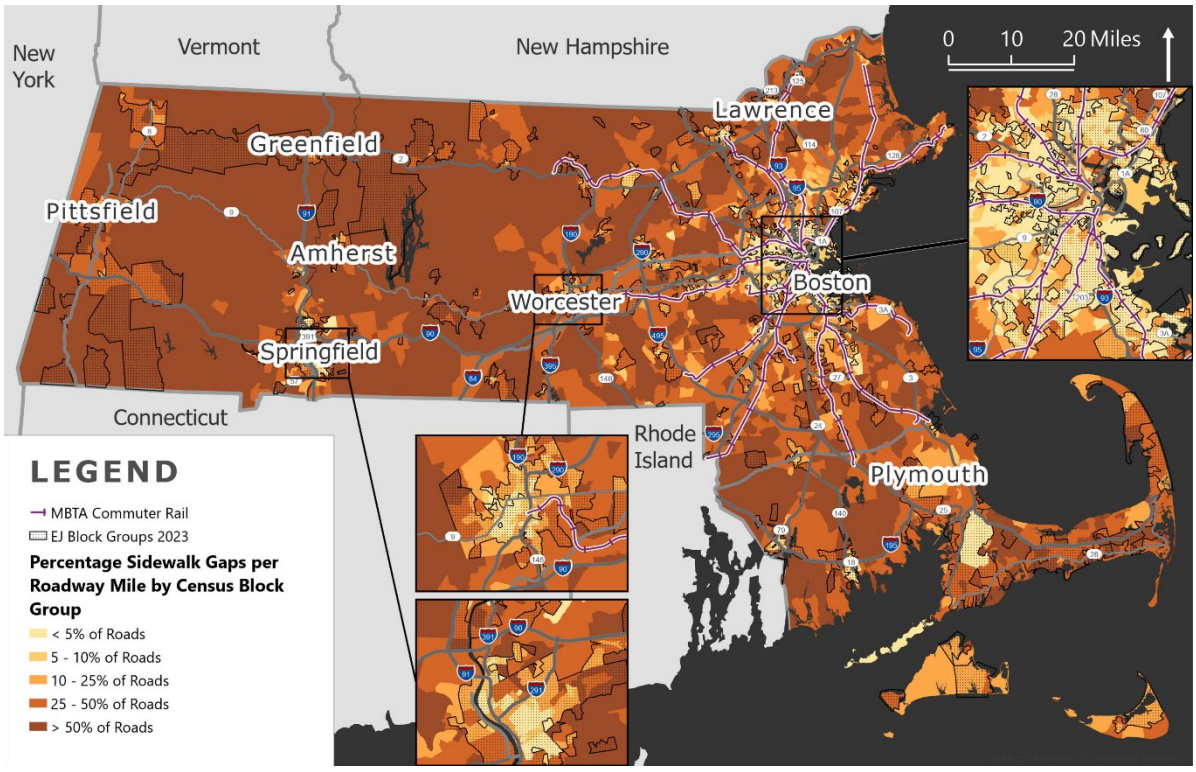
Active Transportation—Sidewalk Gaps

MassDOT maintains a database of statewide roadway characteristics, including presence of a sidewalk. Gaps in sidewalk coverage were established, reviewed to identify trends, and screened to identify inequalities based on geography and demographics. In addition, the analysis included a review of the sidewalk gaps in proximity to transit stations. The analysis showed that:

- Sidewalk gaps per capita within Environmental Justice communities are highest where the percentage of older adults, limited English proficient, and people with disability are the highest Environmental Justice designations.
- More than half of the sidewalk gaps by linear mile are on local roadways.
- Rural communities have 1.65 times more sidewalk gaps as a percentage of total roadway miles than urban communities.
- Rural communities have 7.98 times more sidewalk gaps per capita than urban communities.
- Approximately 22 percent of roadway miles within ½ mile of transit stops (MBTA Commuter Rail and rapid transit) have sidewalks gaps.
- Within a ½ mile of transit stops only 16 percent of roadway miles in Environmental Justice communities have sidewalks gaps, while 26 percent of roadway miles in non-Environmental Justice communities have sidewalk gaps.

As indicated above, rural communities have more sidewalk gaps than urban communities. Figure 3.15 illustrates the sidewalk gaps, with the Environmental Justice overlay.

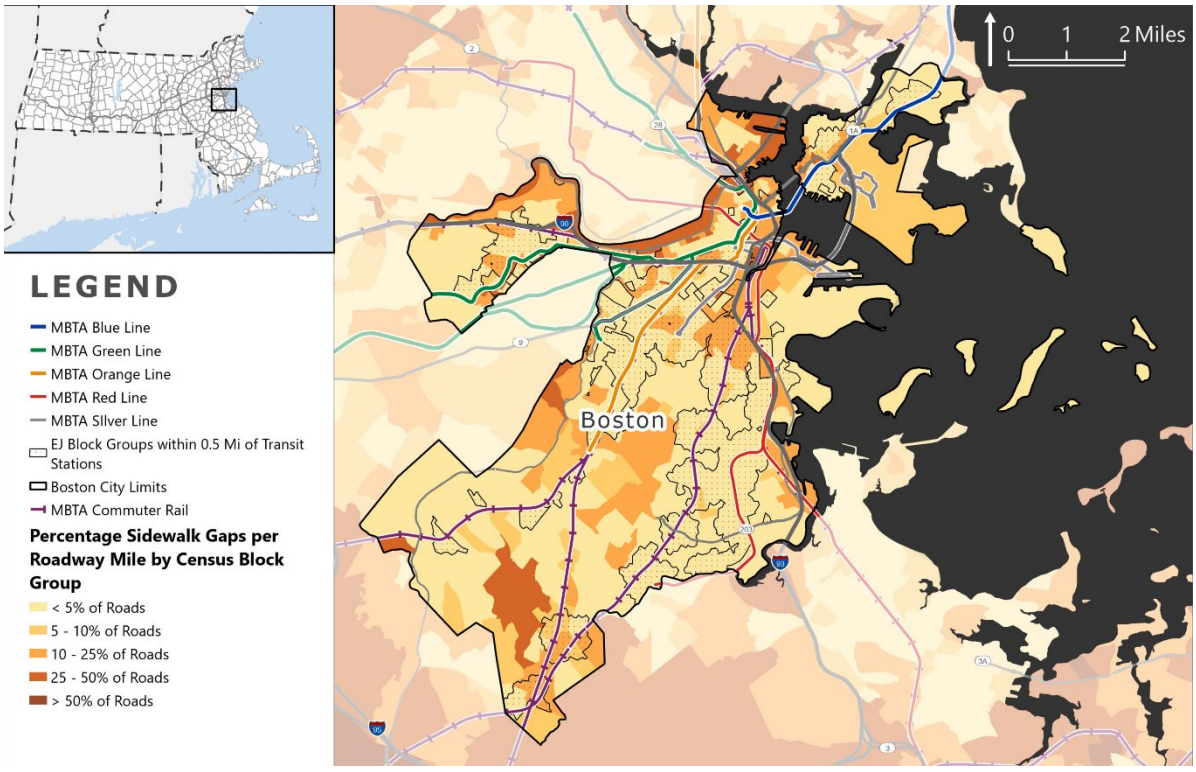
Figure 3.15 Sidewalk Gaps, Environmental Justice Communities



Source: 2016–2020 5-Year ACS, MassDOT Road Inventory 2021.

As indicated above, non-Environmental Justice communities experience a higher rate of sidewalk gaps in roadway miles within ½ mile of transit stops than Environmental Justice communities. Figure 3.16 illustrates the sidewalk gaps, with the Environmental Justice overlay and the proximity to transit stations.

Figure 3.16 Sidewalk Gaps, Environmental Justice Communities & Transit Buffer



Source: 2016–2020 5-Year ACS, MassDOT Road Inventory 2021.

Travel Experience

The travel experience analysis considered the condition of assets across the Commonwealth to gain an understanding of concentration of assets needing repair. These data were also screened to identify inequalities based on geography and demographics as well as proximity to transit stations.

The travel experience analysis demonstrated that traditionally marginalized communities and urban communities experience fewer roadways and bridges in poor/fair condition per capita than other communities. Similarly, fewer curb ramp deficiencies exist in traditionally marginalized communities and urban communities. In contrast, there are more deficient curb ramps adjacent to transit stops traditionally in marginalized communities, indicating an inequity for transit users.

State of Good Repair—Pavement Condition

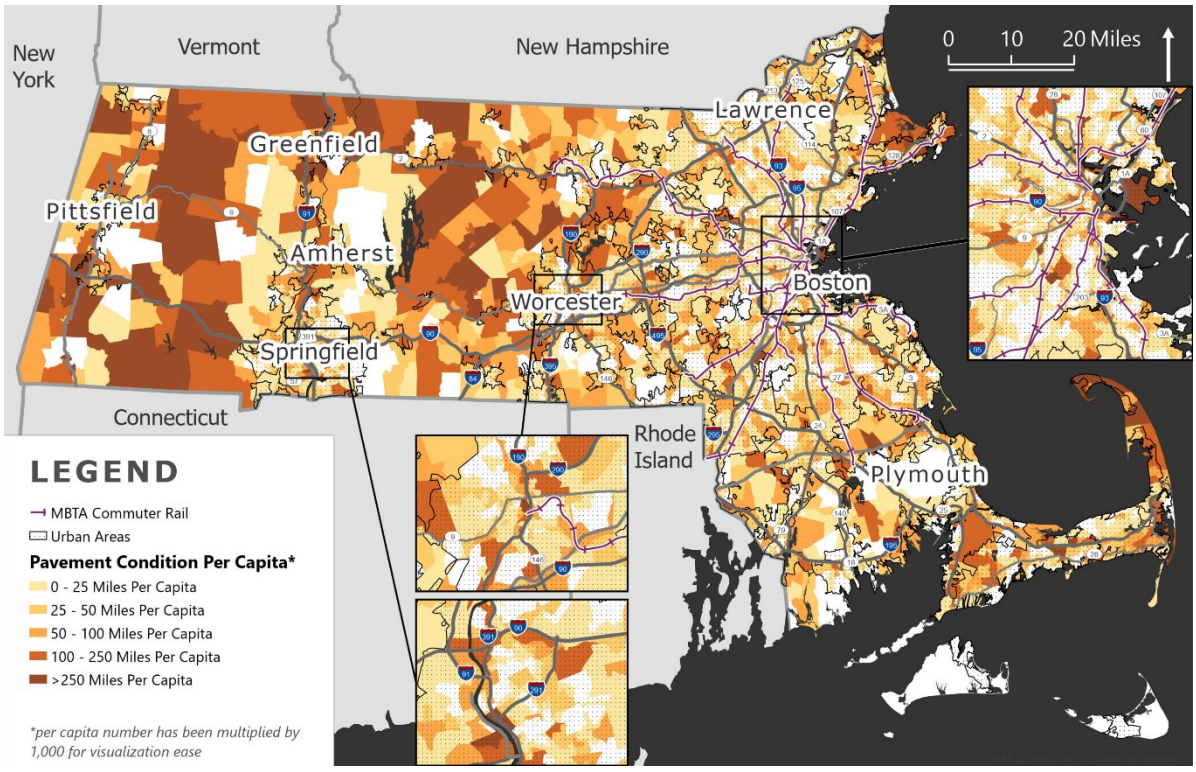
MassDOT maintains a pavement condition database for roadways throughout the state. The pavement condition was reviewed to identify trends in pavement in poor/fair condition and screened to identify inequalities based on geography and demographics. The analysis showed that:

- Non-Environmental Justice communities have 1.46 times more poor/fair road condition per capita than Environmental Justice communities.

- Rural communities have 3.53 times more poor/fair road condition per capita than urban communities.
- Within Environmental Justice communities, communities with concentrations senior populations and low-income households have the most poor/fair road condition miles per capita.

As indicated above, non-Environmental Justice communities experience a higher rate of poor/fair pavement condition than Environmental Justice communities. Similarly, rural communities experience a higher rate of poor/fair pavement condition than Urban communities. Figure 3.17 illustrates the pavement condition per capita, with urban/rural boundaries overlaid.

Figure 3.17 Pavement Condition, Urban/Rural Boundaries



Source: 2016–2020 5-Year ACS, MassDOT Pavement Condition 2020.

State of Good Repair—Bridge Condition

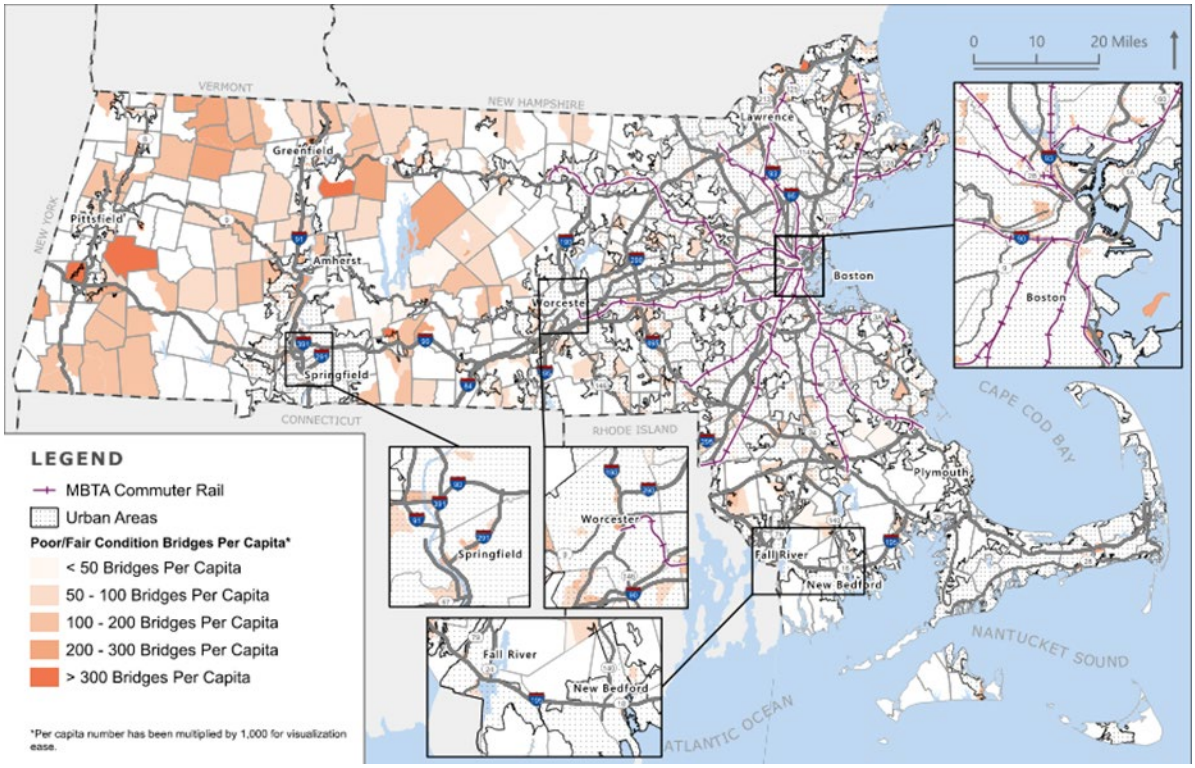
MassDOT maintains a statewide database of bridge condition. The bridge condition data was reviewed to identify trends of bridges in poor/fair condition and screened to identify inequalities based on geography and demographics. The analysis showed that:

- Non-Environmental Justice communities have 1.32 times more bridges in poor/fair condition per capita than Environmental Justice communities.
- Rural communities have 4.37 times more bridges in poor/fair condition per capita than urban communities.

- Communities with concentrations of senior and limited English proficient households have the most bridges in poor/fair condition per capita of Environmental Justice communities.

As indicated above, non-Environmental Justice communities experience a higher rate of bridges in poor/fair condition than Environmental Justice communities. Similarly, rural communities experience a higher rate of bridges in poor/fair condition than urban communities. Figure 3.18 illustrates the bridges in poor/fair condition per capita, with urban/rural boundaries.

Figure 3.18 Bridge Condition, Urban/Rural Boundaries



Source: 2016–2020 5-Year ACS, MassDOT Bridges 2022.

State of Good Repair—Curb Ramps

MassDOT maintains data regarding the presence and condition of curb ramps throughout the state. Deficient curb ramps were reviewed to identify trends and screened to identify inequalities based on geography and demographics. In addition, the analysis included a review of curb ramp deficiencies in the proximity of transit stations. The analysis showed that:

- Non-Environmental Justice communities have 1.47 times the deficient curb ramps per capita than Environmental Justice communities.
- Urban communities have 8.2 times the deficient curb ramps than rural communities; however, rural communities have 1.27 times the deficient curb ramps per capita than urban communities.

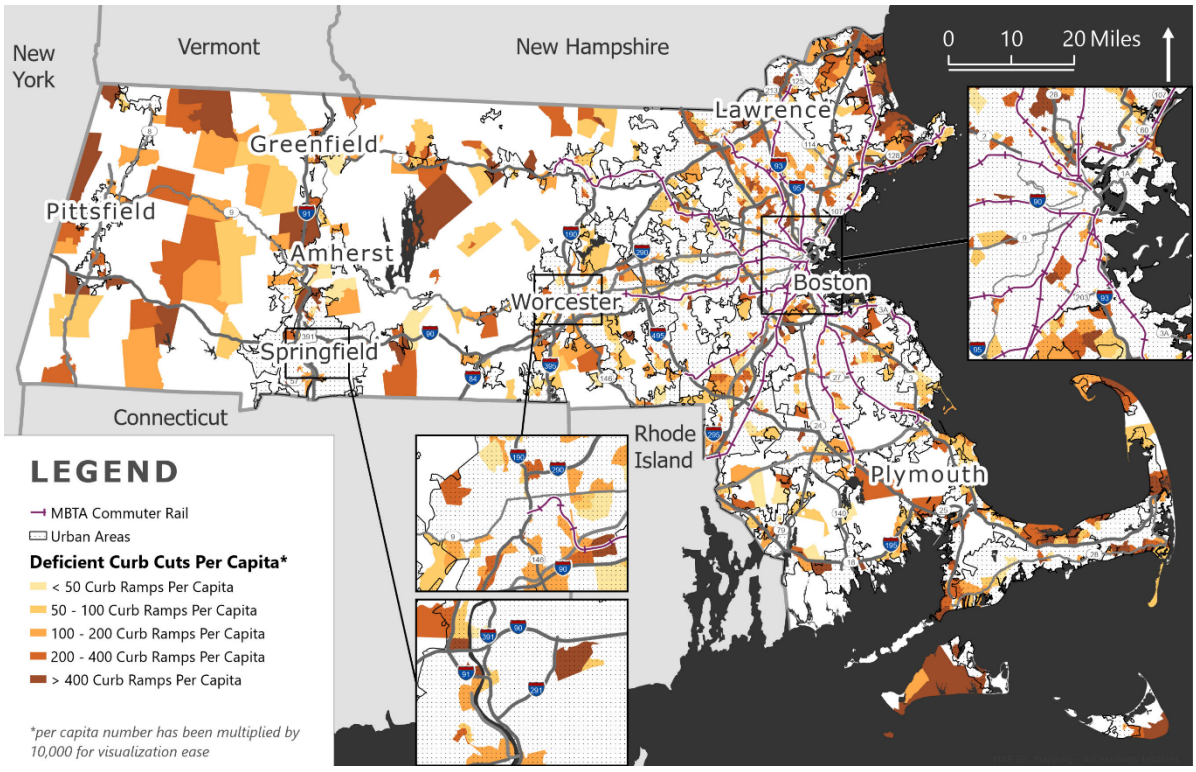
- Communities with concentrations of LEP households, seniors, and people with disabilities have the most deficient curb ramps per capita of Environmental Justice communities.
- Within half a mile of MBTA rapid transit stations, nine percent of the curb ramps are deficient.
- Within half a mile of MBTA rapid transit stations, 18 percent of the curb ramps within Environmental Justice communities are deficient while five percent of curb ramps within non-Environmental Justice communities are deficient.
- Within half a mile of MBTA Commuter Rail stations, 11 percent of the curb ramps are deficient.
- Within half a mile of MBTA Commuter Rail stations, 14 percent of the curb ramps within Environmental Justice communities are deficient while nine percent of curb ramps within non-Environmental Justice communities are deficient.

As indicated above, non-Environmental Justice communities experience a higher rate of deficient curb ramps than Environmental Justice communities per capita. Similarly, rural communities experience a higher rate of deficient curb ramps than urban communities per capita. Figure 3.19 illustrates the curb ramp condition per capita and with urban/rural boundaries.

Table 3.5 Deficient Curb Ramps within Half a Mile of Transit Stops

Community	Deficient Curb Ramps	Total Curb Ramps	% Deficient
Environmental Justice Community	126	792	16%
Non-Environmental Justice Community	129	1,766	7%

Figure 3.19 Curb Ramp Condition, Urban Boundaries



Source: 2016–2020 5-Year ACS, MassDOT Pedestrian Curb Cuts 2018.

Reliability

The reliability analysis considered how travelers experience varying levels of congestion and reliability on different segments of the roadway network at different times of day. It followed a similar methodology and updates portions of MassDOT's *Congestion in the Commonwealth* including roadway segments or corridors included in this analysis. The analysis considered PTI, a measure of travel time reliability that is commonly used in transportation planning. PTI is a reliability measure that represents the total travel time that should be planned when an adequate buffer time is included. It compares near-worst case (95th percentile) travel time to a travel time in free-flow traffic. A value of 2.0 means that for a 20-minute trip in little to no traffic, a traveler should plan on the trip taking 40 minutes.

Of the segments evaluated, the analysis identified the most consistently congested and unreliable segments of the Commonwealth's roadway network and weighted this information by MPO to take into account the diversity of transportation conditions across the state. The analysis showed that:

- People traveling via roadways across the Commonwealth must consistently plan for at least 2.5 times longer than free flow travel time and must be prepared for the possibility of their commute taking up to 8 times longer than free flow conditions during the most vital daily travel times. This finding is supported by calculations showing that the average planning time index (PTI) is above 2.5 for all of the top 20 most congested corridors in the state from 5 a.m. to 8

p.m., with some corridors averaging over eight PTI during morning peak periods and seven during evening peak periods.

- Several major commuter corridors in the Boston MPO region have average PRI above 3.5, making it the most consistently and intensely congested region in Massachusetts. Other MPO regions, such as Cape Cod and Central Massachusetts, also contain corridors where the average PTI exceeds two, illustrating that congestion and travel time variability extend far beyond the Boston region.

- Only six percent of major commuter corridors in the state have a PTI below or equal to one, meaning commuters across all regions must plan travel time in excess of free flow conditions at any given point during the day.

Travel Time Reliability

Estimates of travel time reliability were also developed using the same data set as the congestion frequency and severity analysis. Travel time reliability was evaluated across an average day and during the morning and evening peak commuting hours. Table 3.6, Table 3.7, and Table 3.8 show the 20 most unreliable corridors based on average PTI for the daily, morning, and evening peak periods, respectively.

Table 3.6 Top 20 Unreliable Corridors (Statewide)—Average PTI for Entire Day (5 a.m. to 8 p.m.)

Corridor	MPO	Average PTI
I-93 | MA-3 to MA-203 (Northbound)	Boston Region	4.96
Leverett Connector (Eastbound)	Boston Region	4.79
I-93 | Morrissey to I-90 (Southbound)	Boston Region	4.23
I-93 | I-90 to U.S.-1 (Southbound)	Boston Region	3.89
I-93 | MA-203 to Morrissey (Northbound)	Boston Region	3.58
I-93 | U.S.-1 to MA-16 (Southbound)	Boston Region	3.47
I-93 | Morrissey to I-90 (Northbound)	Boston Region	3.30
Leverett Connector (Westbound)	Boston Region	3.25
I-93 | MA-3 to MA-203 (Southbound)	Boston Region	2.94
I-90 | I-95 to Newton Corner (Eastbound)	Boston Region	2.90
I-93 | MA-16 to MA-28 (Southbound)	Boston Region	2.86
MA-28 | Bourne Bridge (Southbound)	Cape Cod	2.85
I-93 | MA-203 to Morrissey (Southbound)	Boston Region	2.83
I-93 | MA-24 to MA-3 (Southbound)	Boston Region	2.73
I-93 | MA-24 to MA-3 (Northbound)	Boston Region	2.68
I-93 | I-90 to U.S.-1 (Northbound)	Boston Region	2.68
U.S.-1 | I-93 to MA-16 (Southbound)	Boston Region	2.65
I-90 | I-93 to MA-1A (Westbound)	Boston Region	2.64

Corridor	MPO	Average PTI
U.S.-1 | MA-16 to MA-99 (Northbound)	Boston Region	2.63
I-93 | U.S.-1 to MA-16 (Northbound)	Boston Region	2.60

Table 3.7 Top 20 Unreliable Corridors (Statewide)—Average PTI for AM Period (7 a.m. to 9 a.m.)

Corridor	MPO	Average PTI
I-93 | MA-16 to MA-28 (Southbound)	Boston Region	8.16
U.S.-1 | I-93 to MA-16 (Southbound)	Boston Region	7.44
I-93 | MA-3 to MA-203 (Northbound)	Boston Region	6.66
MA-28 | Bourne Bridge (Southbound)	Cape Cod	5.25
Leverett Connector (Eastbound)	Boston Region	5.07
I-93 | MA-203 to Morrissey (Northbound)	Boston Region	5.07
I-90 | I-95 to Newton Corner (Eastbound)	Boston Region	5.01
I-93 | MA-28 to I-95 (Southbound)	Boston Region	4.58
MA-1A | I-90 to MA-60 (Southbound)	Boston Region	4.55
I-90 | I-93 to MA-1A (Westbound)	Boston Region	4.44
I-90 | Natick to I-95 (Eastbound)	Boston Region	4.28
I-90 | Newton Corner to Allston (Eastbound)	Boston Region	4.27
MA-2 | MA-60 to MA-16 (Westbound)	Boston Region	4.19
I-93 | U.S.-1 to MA-16 (Southbound)	Boston Region	4.16
I-93 | MA-24 to MA-3 (Northbound)	Boston Region	4.09
MA-24 | MA-28 to I-93 (Northbound)	Boston Region	4.66
I-95 | I-93 to MA-128 (Westbound)	Old Colony	3.29
I-95 | I-93 to MA-128 (Westbound)	Boston Region	3.88
I-90 | MA-9 to Natick (Eastbound)	Boston Region	3.87
MA-60 | MA-1A to MA-107 (Westbound)	Boston Region	3.79

Table 3.8 Top 20 Unreliable Corridors (Statewide)—Average PTI for PM Period (4 p.m. to 6 p.m.)

Corridor	MPO	Average PTI
I-93 | I-90 to U.S.-1 (Southbound)	Boston Region	7.36
I-93 | Morrissey to I-90 (Southbound)	Boston Region	7.02
I-93 | Morrissey to I-90 (Northbound)	Boston Region	6.02
I-93 | MA-3 to MA-203 (Northbound)	Boston Region	5.88
Leverett Connector (Eastbound)	Boston Region	5.82
U.S.-1 | MA-16 to MA-99 (Northbound)	Boston Region	5.59
I-93 | U.S.-1 to MA-16 (Northbound)	Boston Region	5.54
I-93 | U.S.-1 to MA-16 (Southbound)	Boston Region	5.33
I-93 | MA-24 to MA-3 (Southbound)	Boston Region	5.11
I-91 | U.S.-5 to I-291 (Southbound)	Pioneer Valley	5.10
Leverett Connector (Westbound)	Boston Region	5.08
I-95 | U.S.-3 to I-93 (Eastbound)	Boston Region	5.07
I-93 | MA-3 to MA-203 (Southbound)	Boston Region	5.02
I-93 | MA-16 to MA-28 (Northbound)	Boston Region	4.74
I-93 | I-90 to U.S.-1 (Northbound)	Boston Region	4.72
I-90 | I-95 to Newton Corner (Eastbound)	Boston Region	4.65
MA-9 | I-95 to HPP (Westbound)	Boston Region	4.38
I-90 | Natick to I-95 (Westbound)	Boston Region	4.32
MA-2 | W. Concord to MA-2A (Eastbound)	Boston Region	4.26
I-90 | I-95 to Newton Corner (Westbound)	Boston Region	4.18

As can be seen in the tables above, there are several corridors, mostly in the Boston Region, that require drivers to plan for a commute that may take up to five times longer than free-flow conditions.

The analysis also considered average travel time reliability by functional classification. Table 3.9 shows the average PTI for an entire day.

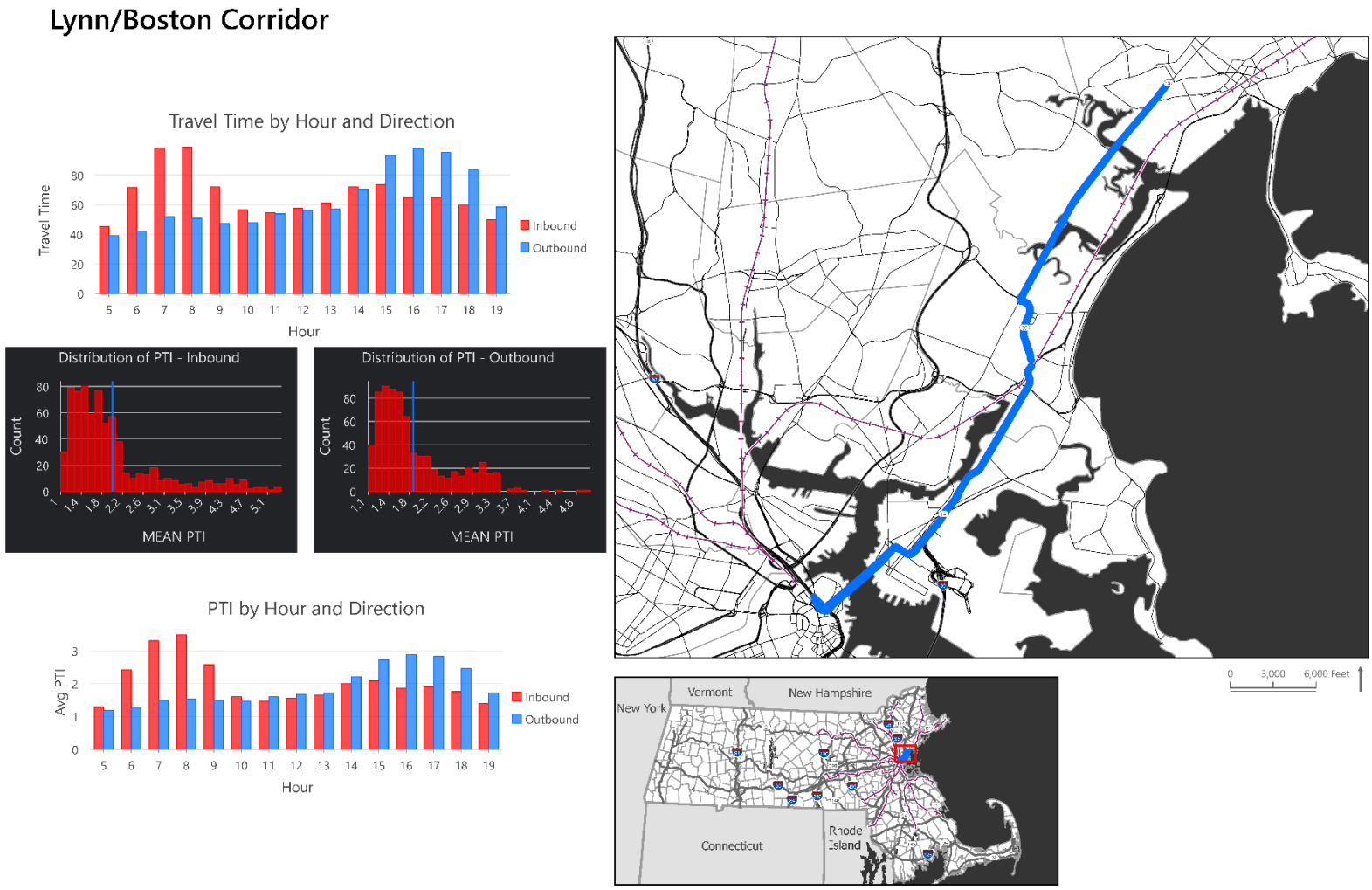
Table 3.9 Federal Functional Class—Average PTI for Entire Day (5 a.m. to 8 p.m.)

Federal Functional Class	Mean PTI
1—Interstate	1.49
2—Principal Arterial—Other Freeways	1.35
3—Principal Arterial—Other	1.50

As can be seen in Table 3.9, all Federal functional classes analyzed have average PTIs greater than 1.35 during the day.

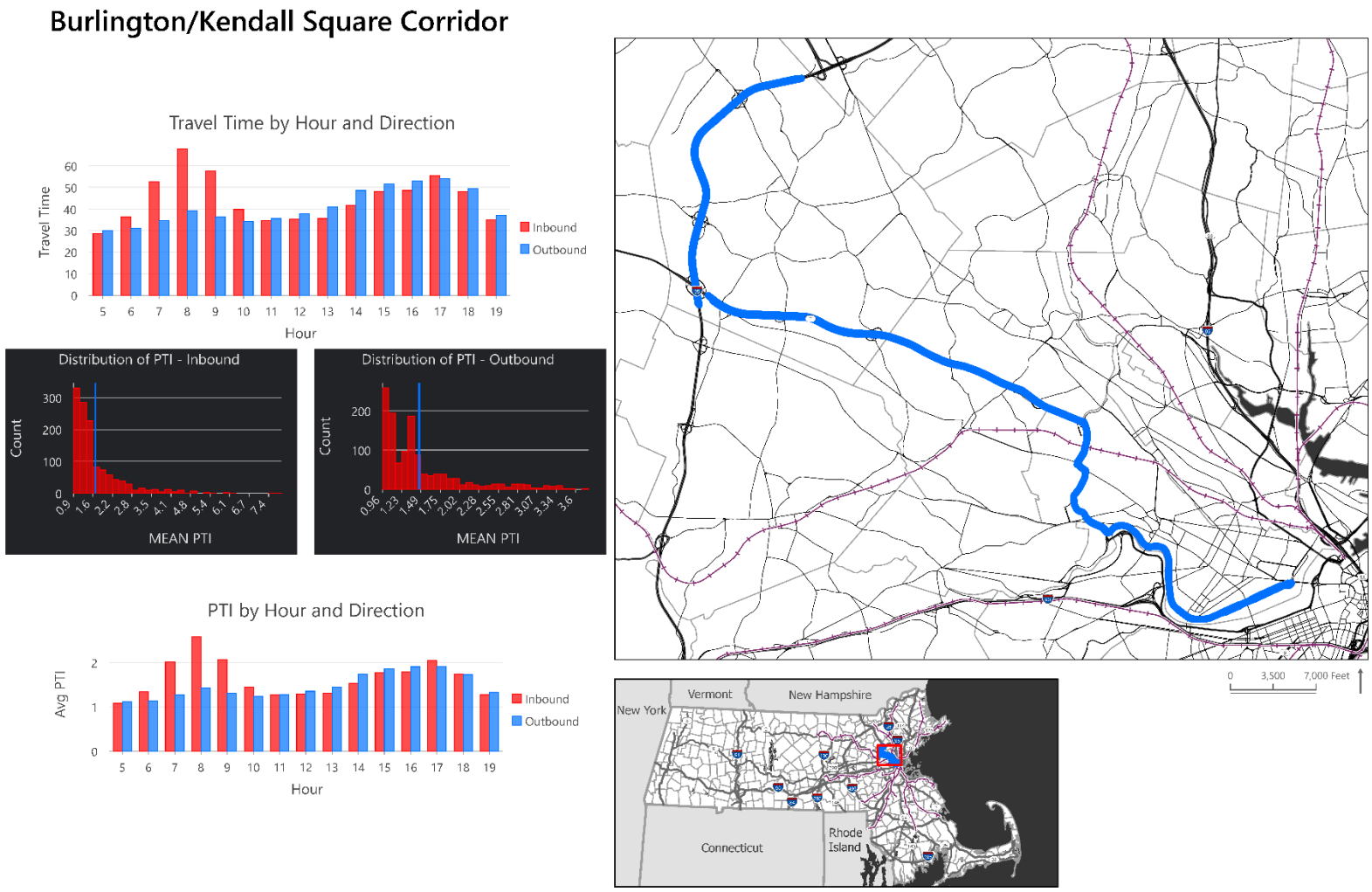
Specific corridors were reviewed with the PTI data to understand reliability for commutes throughout the commonwealth. As can be seen in Figure 3.20 through Figure 3.22, corridors near the Boston region experience high unreliability for inbound commutes during the morning peak commuter period and for outbound commutes during the evening peak commuter period. As shown in the figures, the Lynn to Boston corridor has a PTI greater than 3.0 for both the 7:00 a.m. and 8:00 a.m. periods for inbound commutes, while the Framingham to Northeastern University corridor has a PTI greater than 3.0 for the inbound direction in the 8:00 a.m. period. The Burlington to Kendall corridor has a PTI greater than 2.0 for the inbound direction during the 7:00 a.m., 8:00 a.m., 9:00 a.m., and 5:00 p.m. time periods.

Figure 3.20 PTI—Lynn to Boston Corridor



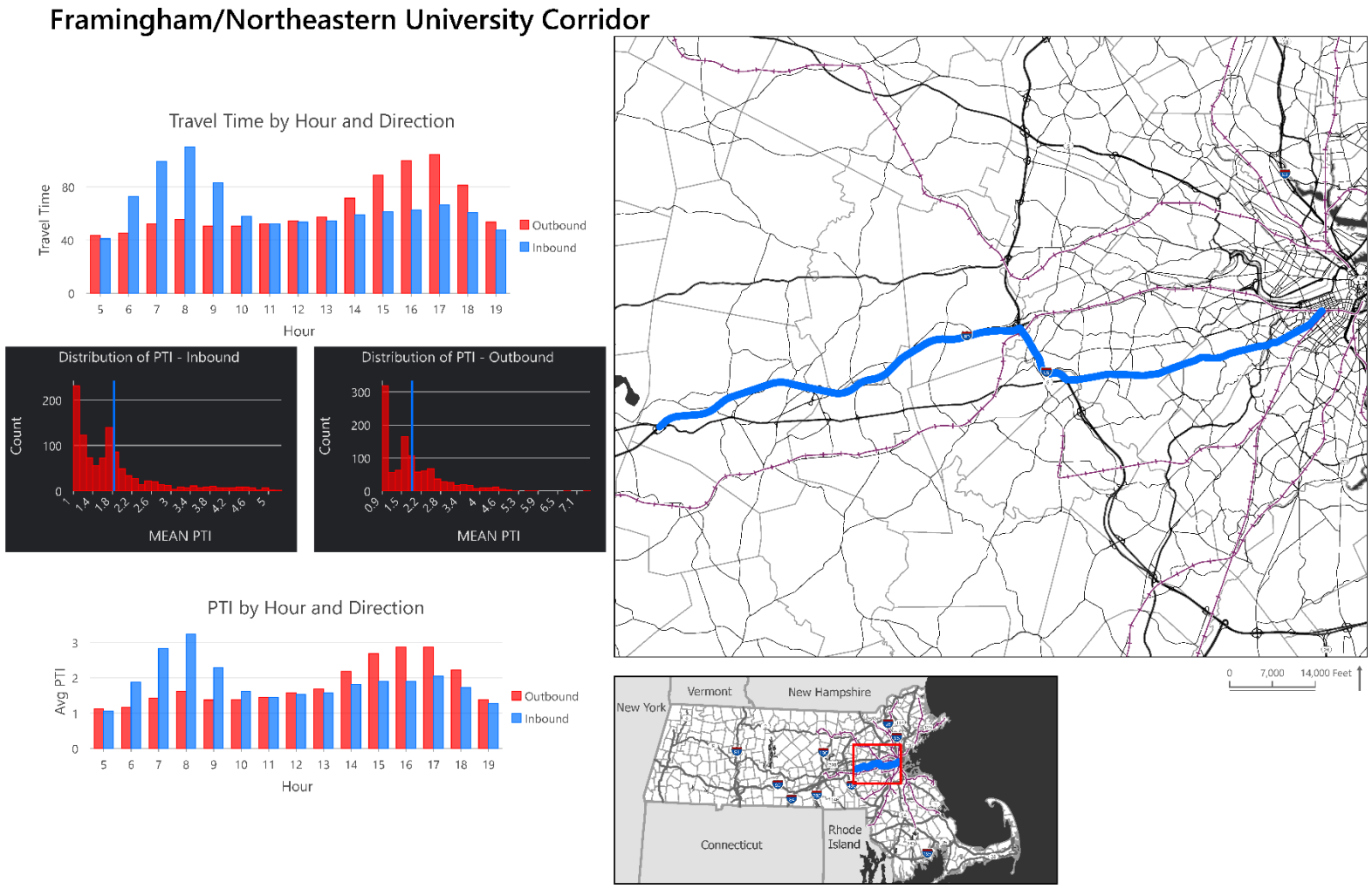
Source: RITIS API to access INRIX data; April 2022-March 2023.

Figure 3.21 PTI—Burlington to Kendall Corridor



Source: RITIS API to access INRIX data; April 2022-March 2023.

Figure 3.22 PTI—Framingham to Northeastern University Corridor



Source: RITIS API to access INRIX data; April 2022-March 2023.

Supporting Clean Transportation

Beyond Mobility integrates findings from the *Clean Energy and Climate Plan (*CECP*)* related to clean transportation. Although no unique analysis was completed for the *Beyond Mobility* needs assessment task under this category, a great deal of the other analyses under the Destination Connectivity, Reliability, and Resiliency Priority Areas overlap with this priority.

Resiliency

The resiliency analysis considered data related to sea level rise and flooding to understand elements of the network at highest risk from the effects of climate change. These data were also screened to identify inequalities based on demographics as well as potential impact to transit stations.

Resiliency analysis demonstrated that 10 feet of sea level rise (SLR) is expected to impact 2,000 cumulative miles of roadway, 81 MBTA stops, 15 commuter rail stops, and 1,249 bus stops. Category 4 hurricane inundation is expected to impact 3,000 cumulative miles of roadway, 102 MBTA stops, 21 commuter rail stops, 2,232 bus stops. SLR and hurricane inundation is expected to impact non-marginalized communities at a higher rate than Environmental Justice communities.

Sea Level Rise

The National Oceanic and Atmospheric Administration Office for Coastal Management (NOAA) compiles SLR data, quantifying the potential inundation of coastal areas resulting from a projected one- to ten-foot rise in sea levels above current “mean higher high water” conditions. Table 3.10 shows the jurisdiction of roadway miles projected to be impacted by SLR of up to 10 feet. As shown, more than 2,000 cumulative miles of roadway are impacted with 10 feet of SLR. Nearly 500 additional roadway miles are impacted with a shift from four to five feet of SLR.

Table 3.10 Roadway Miles Impacted by Sea Level Rise (up to 10 feet) by Jurisdiction

Jurisdiction	Total Length of Roads (Mi)	Percent of Total
Total Miles	**2,013**	**100%**
MassDOT Owned	148	7%
Other Ownership	1,865	93%

Table 3.11 Roadway Miles Impacted by Sea Level Rise (up to 10 feet)

Sea Level Rise (feet)	Cumulative Miles of Roadway Impacted
1	53
2	96
3	200
4	383
5	855
6	1,201
7	1,492
8	1,734
9	1,967
10	2,184

The SLR data were also screened to identify inequalities based on geography and demographics and showed that SLR is expected to impact non-Environmental Justice communities 2.73 times more per capita than Environmental Justice communities.

In addition, the analysis included a review of SLR in the proximity of transit stations, finding that:

- No MBTA rapid transit or commuter rail stations are impacted until at least four feet of SLR
- 81 MBTA rapid transit stations are impacted at 10 feet of SLR
- 15 MBTA commuter rail stations are impacted at 10 feet of SLR
- 1,249 MBTA bus stops are impacted at 10 feet of SLR

Table 3.12 shows the cumulative transit stops impacted by sea level rise (up to 10 feet).

Table 3.12 Transit Stops Impacted by Sea Level Rise

Sea Level Rise (feet)	Cumulative MBTA Stops Impacted	Cumulative CR Stops Impacted	Cumulative Bus Stops Impacted
1	0	0	2
2	0	0	2
3	0	0	21
4	2	1	78
5	22	5	364
6	40	9	648
7	56	11	842
8	64	14	970
9	74	14	1,120
10	81	15	1,249

The analysis also included a review of SLR in relationship to pavement and bridge conditions, finding that:

- 161 miles of roadways in poor/fair are impacted at 10 feet SLR.
- SLR on roadways in poor/fair condition is expected to occur in Environmental Justice communities; 1.08 times more per capita than non-Environmental Justice communities.
- 87 bridges in poor/fair condition are impacted at 10 feet SLR

Table 3.13 shows the cumulative miles of roadways in poor or fair condition and bridges in poor/fair condition impacted by SLR of up to 10 feet.

Table 3.13 Roadways and Bridges Impacted by Sea Level Rise

Sea Level Rise (feet)	Cumulative Miles of Roadways in Poor/Fair Condition	Cumulative Number of Bridges in Poor/Fair Condition
1	8	26
2	9	27
3	12	28
4	18	29
5	63	32
6	90	62
7	115	67
8	133	72
9	148	77
10	161	81

Hurricane Inundation Zone

The U.S. Army Corps of Engineers, New England District, compiles Hurricane Inundation Zone (HIZ) data to assist emergency management officials in hurricane preparedness and operations. This data represents worst-case Hurricane Surge Inundation areas for Category 1 through 4 hurricanes striking the coast of Massachusetts. More than 3,000 cumulative miles of roadways lie within Hurricane Category 4 impact areas in the state. Table 3.14 shows the jurisdiction of roadway miles impacted by hurricane inundation (up to Category 4).

Table 3.14 Roadway Miles Impacted by Hurricane Category 4 by Jurisdiction

Jurisdiction	Total Length of Roads (Mi)	Percent of Total
Total Miles	**3,385**	**100%**
MassDOT Owned	241	7%
Other Ownership	3,144	93%

The HIZ data was further reviewed to identify trends and screened to identify inequalities based on geography and demographics. Hurricane Inundation is expected to impact non-Environmental Justice communities 1.94 times more per capita than Environmental Justice communities.

In addition, the analysis included a review of SLR in the proximity of transit stations, finding that:

- 102 MBTA rapid transit stations are located within Hurricane Category 4 impact area
- 21 MBTA commuter rail stations are located within Hurricane Category 4 impact area
- 2232 MBTA bus stops are located within Hurricane Category 4 impact area

Table 3.15 shows the cumulative transit stops impacted by hurricane inundation (up to Category 4).

Table 3.15 Transit Stops Impacted by Sea Level Rise

Hurricane Category	Cumulative MBTA Rapid Transit Station Impacted	Cumulative Commuter Rail Stations Impacted	Cumulative MBTA Bus Stops Impacted
1	37	5	529
2	84	13	1,338
3	95	14	1,842
4	102	21	2,232

The analysis also included a review of hurricane inundation in relationship to pavement and bridge conditions, finding that:

- 232 miles of roadways in poor or fair condition are located within Hurricane Category 4 impact area
- 81 bridges in poor or fair condition are located within Hurricane Category 4 impact area

Table 3.16 shows the infrastructure impacted by hurricane inundation (up to Category 4).

Table 3.16 Roadways and Bridges Impacted by Hurricane Inundation

Hurricane Category	Cumulative Miles of in Poor/Fair Condition Roads	Cumulative Number of Bridges in Poor/Fair Condition
1	53	23
2	143	54
3	187	63
4	231	81

4.0 Conclusions

The *Beyond Mobility* Needs Assessment identifies transportation-related barriers, needs, and inequalities throughout the Commonwealth. It highlights challenges in each of Priority Area and informs both the Plan's Problem Statements and ultimately the development of Action Items for implementation, as outlined below.

- The Safety analysis shows that traditionally marginalized communities experience fatal and serious injury collisions at a higher rate than other communities. This is especially true for crashes that involved a pedestrian and/or bicyclist. Rural communities have a slightly higher rate of fatal/serious injury crashes per capita than urban communities. However, urban communities have significantly higher pedestrian and/or bicycle crash rates per capita than rural communities. These findings contribute to Action Items committed to prioritizing safety projects in communities disproportionately burdened by unsafe conditions and tracking safety action items, measures, and crash rate disparities.

- The Destination Connectivity data indicate that Environmental Justice communities have a higher potential for walkable trips and potential for everyday biking than non-Environmental Justice communities, even though these communities have fewer existing and planned bicycle facilities. The data also shows that rural communities have nearly eight times the sidewalk gaps per capita than urban communities. These conclusions helped inform Action Items focused on exploring opportunities to support expanding employment transportation to low-income individuals and further assessing commute time disparities.

- The Travel Experience data conclude that rural communities have a higher rate per capita of poor/fair condition of bridges, pavement conditions, and deficient curb ramps than urban communities. These findings contribute to Action Items related to building out high-quality data layers to maintain the most up-to-date condition information and utilize this data to pursue funding opportunities.

- The Reliability data conclude that most major commuter corridors in the state are unreliable, regardless of functional classification, region, or mode. These conclusions helped inform action items centered around investing in planning studies, a roadway pricing study, and efforts to expand transit infrastructure and reduce roadway bottlenecks and delays.

- The Resiliency data conclude that both sea level rise and hurricane inundation are extreme threats to Massachusetts infrastructure. A major sea level rise or hurricane inundation event would impact thousands of miles of roadway, hundreds of transit stations, and dozens of bridges throughout the Commonwealth. These conclusions helped inform action items focused on prioritizing funding and grant opportunities for resiliency projects, project screening for climate risk, and exploration of a culvert replacement and improvement program.

Thank you

July 2024

Beyond Mobility

Massachusetts 2050 Transportation Plan

Appendix D: System Performance Report

Final Plan

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1.0 Introduction

Pursuant to the Moving Ahead for Progress in the 21st Century Act (MAP-21) Act enacted in 2012 and the Fixing America's Surface Transportation Act (FAST Act) enacted in 2015, State Departments of Transportation (DOT) and Metropolitan Planning Organizations (MPO) must apply a transportation performance management approach in carrying out their Federally-required transportation planning and programming activities. The process requires the establishment and use of a coordinated performance-based approach to transportation decision-making to support national goals for the Federal-aid highway and public transportation programs.

To help transportation agencies take the necessary steps toward achieving the national goals, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) promulgated a series of rulemakings between 2016 and 2019 that established performance measures for the Federal-aid highway and transit programs. The Federal performance measure rules fall into three broad categories: safety (highway and transit); infrastructure condition (highway and transit); and system performance (highway only).

It should be noted that the highway requirements pertain to the National Highway System (NHS), the majority of which is under MassDOT ownership. These targets are set directly by the DOT and MPOs. By contrast, the transit requirements are primarily set by transit operators with technical assistance and coordination from MassDOT and the MPOs. These operators include the Massachusetts Bay Transportation Authority (MBTA) and 15 Regional Transit Authorities (RTAs).

Under Federal rulemakings, MassDOT must include a description of Federal transportation performance measures and targets and a system performance report in its long range transportation plan. The system performance report evaluates the condition and performance of the transportation system with respect to the Federal performance targets, including progress achieved by MassDOT in meeting those targets. Future system performance reports must also compare current performance with system performance recorded in previous reports. **To satisfy this requirement, MassDOT developed this System Performance Report as a product of *Beyond Mobility*, the Massachusetts 2050 Transportation Plan.**

2.0 Safety

2.1 Highway Safety

Effective April 14, 2016, the FHWA established the highway safety performance measures[1] to carry out the Highway Safety Improvement Program (HSIP). These safety performance measures include the following:

- Number of fatalities.
- Rate of fatalities per 100 million vehicle miles traveled (VMT).
- Number of serious injuries.
- Rate of serious injuries per 100 million vehicle miles traveled.
- Number of combined non-motorized fatalities and non-motorized serious injuries.

The Commonwealth of Massachusetts' top priority is ensuring the safety of all roadway users: whether they are driving a vehicle, truck, or motorcycle; riding as a passenger; taking transit; walking; bicycling; or using any other mobility device. One life lost or seriously altered on the Commonwealth's roadways is one too many. Massachusetts is committed to the goal of zero roadway fatalities and serious injuries.

To achieve zero roadway fatalities and serious injuries, Massachusetts is adopting a **Safe System Approach**, a U.S. Department of Transportation endorsed framework for addressing roadway safety holistically as a system. As defined in MassDOT's Strategic Highway Safety Plan (SHSP)[2], the Safe System Approach works by anticipating human mistakes and keeping impact energy on the human body at tolerable levels.

Critical to the success of the SHSP and safety-related initiatives is identifying and mitigating risks in the transportation system to prevent serious crashes, rather than waiting for crashes to occur and reacting afterward. Implementing this approach requires shared responsibility across agencies and communities. Everyone is accountable and has a role to play, including those who plan, program, design, construct, maintain and utilize the roads, as well as those who create, enforce, and adjudicate laws. While road users share some of the responsibility, and must follow the rules of the road system, it is unacceptable to assign users complete responsibility for their safety on a system they do not plan, design, construct, operate, and maintain.

Highway Safety Targets

Per FHWA guidance, the calendar year (CY) 2024 target setting process began with a trend line projection based on the most recent available data. This year, MassDOT also developed a 2022-

1 23 CFR Part 490, Subpart B.
2 https://www.mass.gov/service-details/strategic-highway-safety-plan.

2026 target to be consistent with the Highway Safety Office and National Highway Traffic Safety Administration (NHTSA). These targets are shown in Table 2.1.

Table 2.1 Targets for Highway Safety, 2022–2026

Performance Measure	Current (2022)	2024 Target	2026 Target
Number of Fatalities	378	377	362
Rate of Fatalities per 100 Million VMT	0.62	0.61	0.54
Number of Serious Injuries	2,708	2,708	2,603
Rate of Serious Injuries per 100 Million VMT	4.42	4.36	3.91
Number of Combined Non-Motorized Fatalities and Non-Motorized Serious Injuries	480	445	435

Total Fatalities

Due to higher rates of speeding caused by decreased vehicle miles traveled VMT amid pandemic shutdowns in 2020 and the lingering impacts in 2021 and 2022, roadway fatalities increased relative to previous years. Furthermore, the Infrastructure Investment and Jobs Act (IIJA) requires "performance targets to demonstrate constant or improved performance," so Massachusetts is unable to use increasing targets.

Although the latest 2023 data suggests fatalities are trending towards pre-COVID levels, the data is incomplete and was not used when the target setting process began. Therefore, MassDOT developed the target for CY 2024 by projecting the 2023 and 2024 fatalities to be in line with pre-COVID data. As a result, year over year changes reflect a decrease of approximately 20 percent when comparing 2021 and 2022 to 2023 and 2024. However, the five-year averages from 2018-2022 to 2020-2024 see only a minor decrease from 378 to 377. If this trend continues, the 2022-2026 average will drop to 362, a reduction of four percent.

As always, MassDOT's overarching goal is zero deaths and this goal will be pursued by implementing strategies from the SHSP. The Massachusetts SHSP and Vulnerable Road User Safety Assessment were both updated and finalized in 2023. These strategies help provide details on how the state will drive down fatalities and serious injuries. Moreover, it should be restated that while MassDOT developed numeric targets, **the goal is zero** and MassDOT will continue to work toward that goal by implementing SHSP strategies.

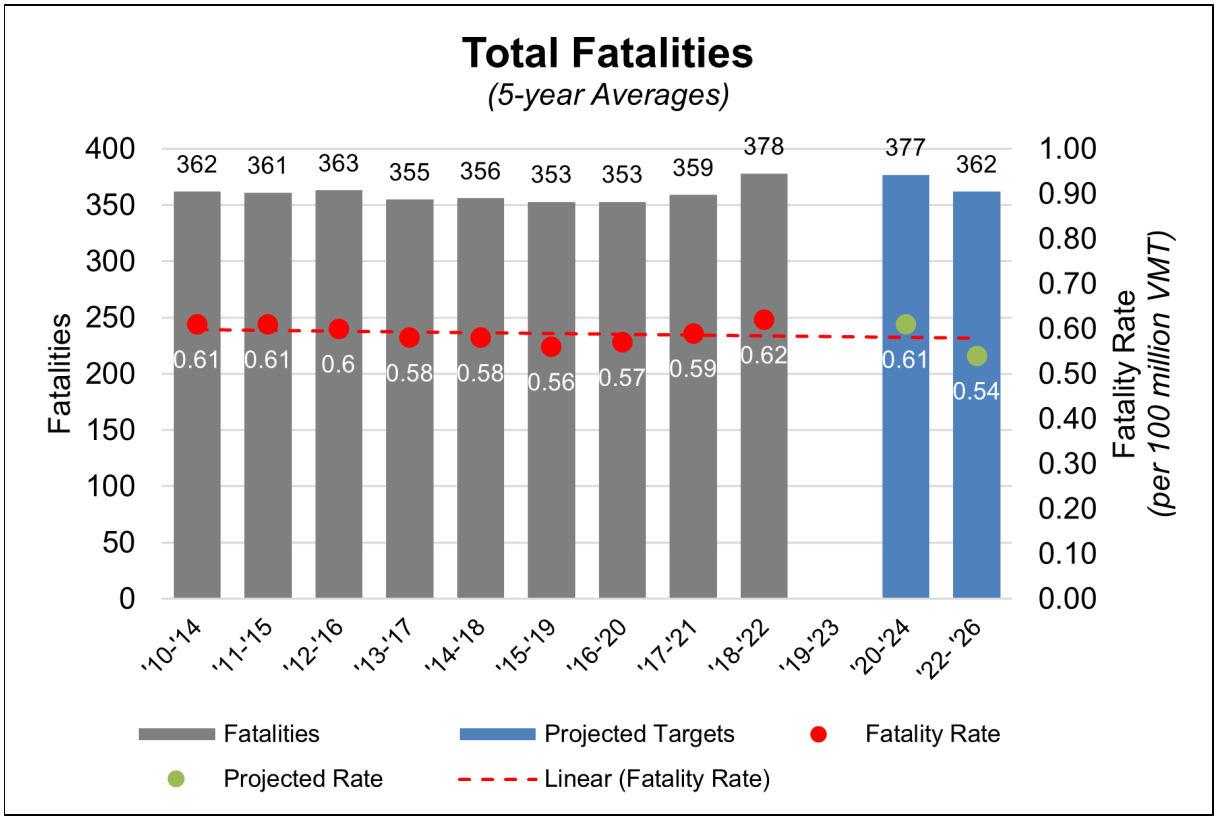
Fatality Rate

The annual fatality rate is the total number of fatalities divided by the annual vehicle miles traveled (in 100 millions) for a given year. This performance target represents the five-year average of the annual fatality rate. The fatality rate illustrates how many roadway deaths occurred per 100 million miles driven by vehicles in Massachusetts.

The COVID-19 pandemic greatly impacted VMT, causing fatality rates to spike in 2020 with significantly lower VMT and slightly higher fatalities. Data projections for 2023 indicate VMT will exceed pre-pandemic levels. Consequently, the five-year average fatality rate is expected to decrease from 0.62 fatalities per 100 million VMT for 2018-2022, to 0.61 fatalities per 100 million VMT in 2020-2024, a reduction of 1.63 percent. If this trend continues, MassDOT projects a decrease to 0.54 fatalities per 100 million VMT by 2026, a reduction of 12 percent.

Figure 1 shows the five-year rolling average fatalities and fatality rate between 2014 and 2022, alongside the targets for 2024 and 2026.

Figure 2.1 Fatalities, 2014–2022 with 2024 and 2026 Targets



Total Serious Injuries

The target setting process began with a trend line projection based on the most recent available data. The 2021 and 2022 serious injury data were not finalized in the statewide crash system during this process, so it is possible these figures will change once that data becomes final.

Due to higher rates of speeding caused by decreased VMT amid pandemic shutdowns in 2020 and the lingering impacts in 2021 and 2022, serious injuries increased relative to previous years. Although the latest 2023 data suggests serious injuries are trending towards pre-COVID levels, the data is incomplete and was not used when the target setting process began. Therefore, MassDOT developed the target for CY 2024 by projecting the 2023 and 2024 serious injuries to be in line with pre-COVID data. As a result, year over year changes reflect a decrease of approximately 10 percent

when comparing 2021 and 2022 to 2023 and 2024. However, the 5-year average from 2018-2022 to 2020-2024 remains the same at 2,708 serious injuries. If this trend continues, the 2022-2026 average will drop to 2,603, a 4 percent reduction.

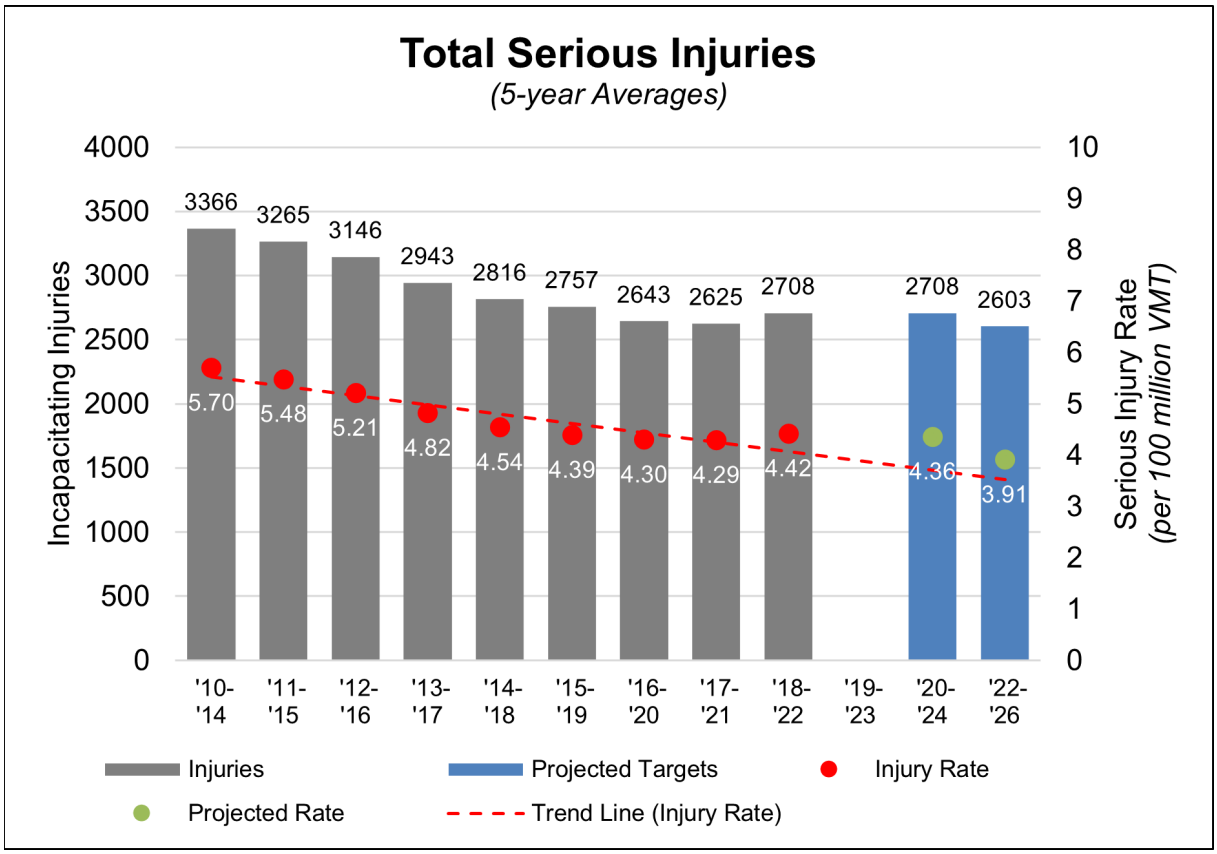
Serious Injury Rate

The serious injury rate is calculated in a similar way as the fatality rate five-year rolling average. The serious injury rate illustrates how many roadway serious injuries occurred per 100 million miles driven by vehicles in Massachusetts.

Similar to the fatality rate, serious injury rates were greatly impacted due to COVID. Following the methods above, the projection is now 4.36 serious injuries per 100 million VMT for 2020-2024. This reflects a 1.36 percent reduction compared to the 2018-2022 serious injuries rate of 4.42. If this trend continues, the 2022-2026 rate will drop to 3.91 serious injuries per 100 million VMT, an 11 percent reduction.

Figure 2 shows the five-year rolling averages for serious injuries and serious injury rate between 2014 and 2022, alongside the targets for 2024 and 2026.

Figure 2.2 Serious Injuries, 2014–2022 with 2024 and 2026 Targets



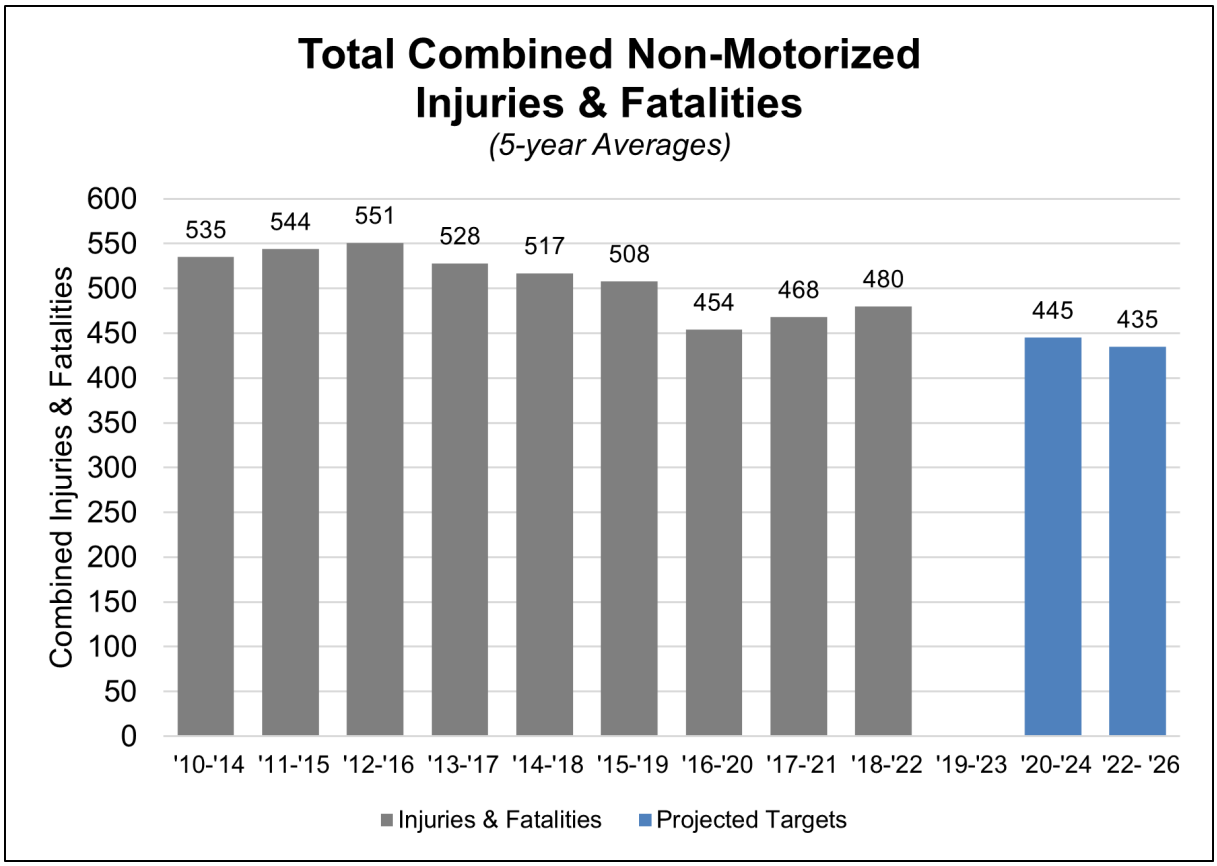
Non-Motorized Fatalities and Serious Injuries

The number of non-motorized fatalities and serious injuries is the combined total of roadway fatalities and serious injuries who were pedestrians, bicyclists, other cyclists, or persons on personal conveyances.

The number of non-motorized fatalities and serious injuries decreased during the start of the pandemic in 2020, followed by an increase in 2021 and further dramatic spike in 2022. Based on the state's emphasis on vulnerable road users, MassDOT anticipates the 2023 and 2024 numbers to match those from 2020. This results in a five-year average of non-motorist fatalities and serious injuries decreasing from 480 (2018-2022) to 445 (2020-2024), a 7.3 percent reduction. Looking ahead to 2026, the average combined non-motorist fatalities and serious injuries is expected to decrease to 435, a reduction of approximately nine percent.

Figure 3 shows the five-year rolling averages for total non-motorized fatalities and serious injuries between 2014 and 2022, alongside the targets for 2024 and 2026.

Figure 2.3 Non-Motorized Injuries and Fatalities, 2014-2022 with 2024 and 2026 Targets



A Final Note

The fatality and serious injury data contained here was developed to align with the data included in MassDOT's annual Highway Safety Improvement Program (HSIP) report. As such, historical data may be different from what was reported in prior years.

The targets were developed in coordination with the Executive Office of Public Safety and Security (EOPSS), the Highway Safety Division, and other sections within MassDOT. Although MassDOT emphasizes that the state's goal is zero fatalities and serious injuries, the state targets presented here are not "goals" but realistic targets considering the events of the last three years. The Secretary of Transportation and Highway Division Administrator for MassDOT approved the targets recognizing that MassDOT must demonstrate short term incremental steps in order to achieve the Commonwealth's goal.

Measuring Over Time: Pedestrian Crash Cluster Area per Population in REJ+ and non-REJ+ Communities

Beyond Mobility explored disparate impacts experienced by Environmental Justice and other vulnerable communities, using MassDOT's definition and data for Regional Environmental Justice "Plus" (REJ+). REJ+ communities include communities with higher concentrations of poverty, non-white households, people with limited English proficiency, households without access to a vehicle, people with disabilities, or people ages 65 years and older, in comparison to nearby communities. For an in-depth description of REJ+ communities, refer to *Beyond Mobility* Section 2.2 Needs Assessment.

Additionally, MassDOT has conducted a longitudinal analysis of the pedestrian crash cluster area per population[3] in REJ+ and non-REJ+ communities by using MassDOT's Top Five-Percent Pedestrian Crash Clusters. While the data is updated annually, each data set reflects a ten-year average. The analysis is based on the past five available data sets (2007-2016, 2008-2017, 2009-2018, 2010-2019, and 2011-2020). This analysis was done by assigning pedestrian crash cluster areas to either REJ+ or non-REJ+ block groups based on their location and then evaluating non-motorist crashes per one million population.

Table 2.2 and Figure 2.4 present the disparity between REJ+ and non-REJ+ communities as it relates to pedestrian crash cluster area per population. The difference in pedestrian crash cluster area between REJ+ and non-REJ+ communities has slightly increased over the past five years of datasets. MassDOT would like to see the disparity between REJ+ and non-REJ+ communities, as well as overall pedestrian crash cluster areas, decrease over time.

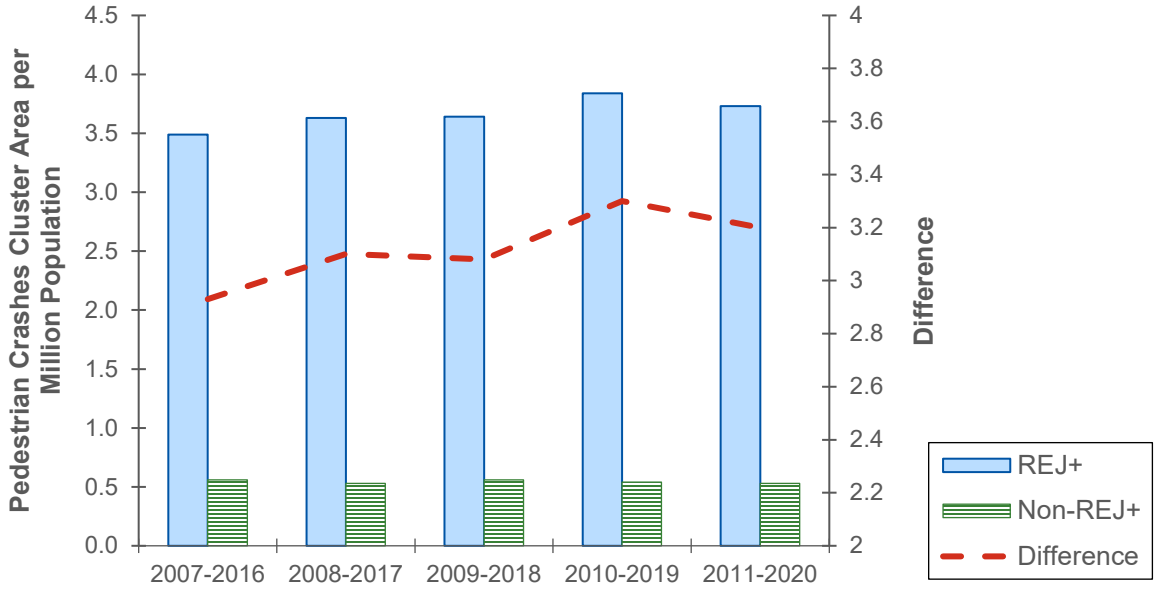
[3] Crash clusters are developed in GIS software using a cluster analysis methodology where multiple crashes are merged together based on proximity, and therefore vary by size. The top five percent of crash clusters are determined using crash severity weighting, with more weight given to fatal and serious injury crashes. Unit is crash cluster area (square miles) per one million population. https://www.mass.gov/doc/2017-top-crash-locations-report/download.

Table 2.2 Pedestrian Crash Cluster Area per Million Population in REJ+ and non-REJ+ Communities, 2016–2020 (Five-Year Average)

Years	REJ+	Non-REJ+	Difference
2007-2016	3.5	0.6	2.9
2008-2017	3.6	0.5	3.1
2009-2018	3.6	0.6	3.1
2010-2019	3.8	0.5	3.3
2011-2020	3.7	0.5	3.2

[a] *Difference of REJ+ minus non-REJ+*

Figure 2.4 Pedestrian Crash Cluster Area per Million Population in REJ+ and non-REJ+ Communities, 2016-2020 (Five-Year Average)



Measuring Over Time: Number of Non-Motorist Serious Injuries and Fatalities per Population in REJ+ and non-REJ+ Communities

A longitudinal analysis of fatal and serious injury non-motorist crashes using MassDOT's IMPACT portal for the years 2018 to 2022 was also performed by assigning non-motorist filtered crashes (pedestrian and bicyclist) to either REJ+ or non-REJ+ block groups based on their location, and then comparing non-motorist crashes per community 100,000 population.

Table 2.3 presents the disparity between REJ+ and non-REJ+ communities as it relates to non-motorist fatal and serious crashes per population. Figure 2.5 and Figure 2.6 illustrate these trends.

While there have been more fatal and serious crashes in REJ+ communities in each data year shown, the disparity between non-motorist fatal and serious injury crashes between REJ+ and non-REJ+ communities has slightly decreased over the past five years of data, with a slight increase in 2022. MassDOT would like to see the disparity between REJ+ and non-REJ+ communities, as well as overall non-motorist crashes, continue to decrease over time.

Table 2.3 Fatal and Serious Non-Motorist Crashes per 100,000 Population in REJ+ and non-REJ+ Communities, 2018–2022

	Pedestrian			Bicyclist		
Year	REJ+	Non-REJ+	Difference[1]	REJ+	Non-REJ+	Difference
2018	43	16	27	19	11	8
2019	43	16	26	20	12	8
2020	28	11	18	15	10	5
2021	31	13	18	15	11	4
2022	37	15	22	19	13	6

[1] *Difference of REJ+ minus non-REJ+*

Figure 2.5 Fatal and Serious Pedestrian Crashes per 100,000 Population in REJ+ and non-REJ+ Communities, 2018–2022

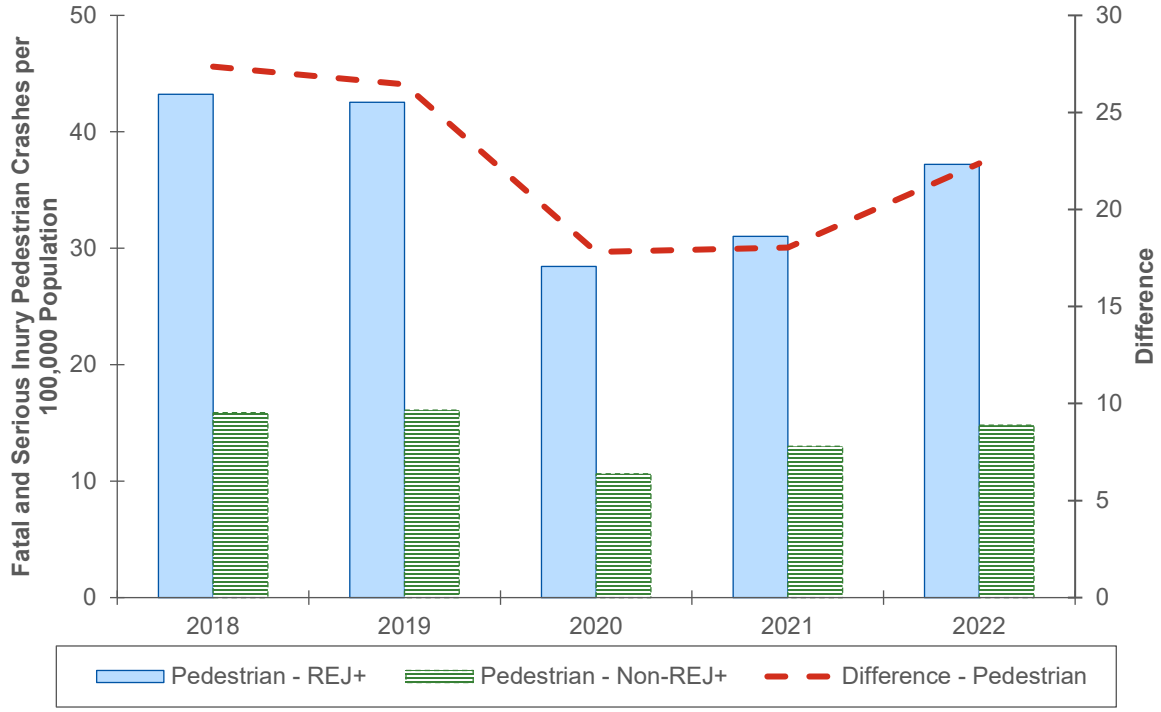
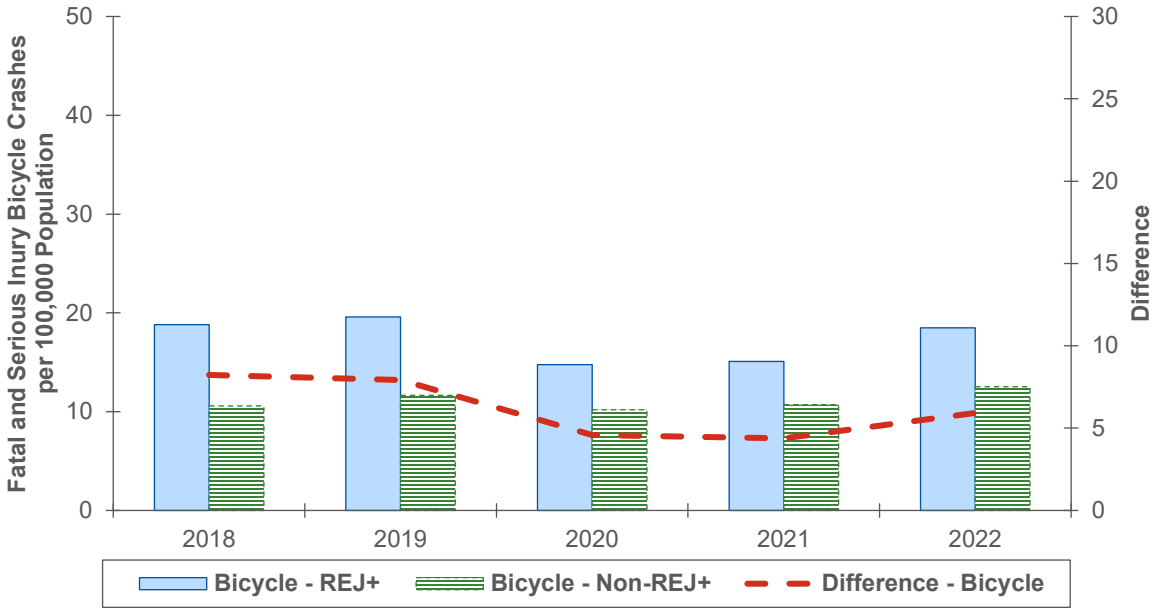


Figure 2.6 Fatal and Serious Bicyclist Crashes per 100,000 Population in REJ+ and non-REJ+ Communities, 2018-2022



MassDOT's Vulnerable Road User Assessment found that:[4]

- 50 percent of all fatal and serious injury pedestrian crashes occurred in a REJ+ community, and 38 percent of all fatal and serious injury bicycle crashes occurred in a REJ+ community.
- Crashes involving vulnerable road users (e.g., pedestrians, bicyclists, and other non-motorists) increased between 2020 and 2022.
- Pedestrian fatalities reached a new high in Massachusetts in 2022, with 101 people dying in a crash-related incident. Bicyclist fatalities were also high in 2022, but still lower than five of the recorded years since 2004, with 10 cyclists dying on the road in 2022, and 124 cyclists seriously injured.

The Assessment also found a correlation between crashes and transit proximity: 41 percent of pedestrian-involved crashes and 34 percent of bicyclist crashes occurred within 300 feet of bus stops statewide, and this statistic is even higher in Boston-area communities, where 45 percent of bicyclist crashes and 50 percent of pedestrian crashes happened within 300 feet of an MBTA bus stop. MassDOT has a goal of reducing crashes in proximity to transit.

Measuring Over Time: Number of Vehicular Fatal and Serious Injury Crashes per Population in REJ+ and non-REJ+ Communities

A longitudinal analysis of vehicular fatal and serious injury crashes using MassDOT's IMPACT portal for the years 2018 to 2022 was performed by assigning fatal and serious injury crashes to either

[4] https://storymaps.arcgis.com/stories/8b36ed2f1f3749b7ac085c0ca5b8efa7

REJ+ or non-REJ+ block groups based on their location and then compared crashes per community 100,000 population.

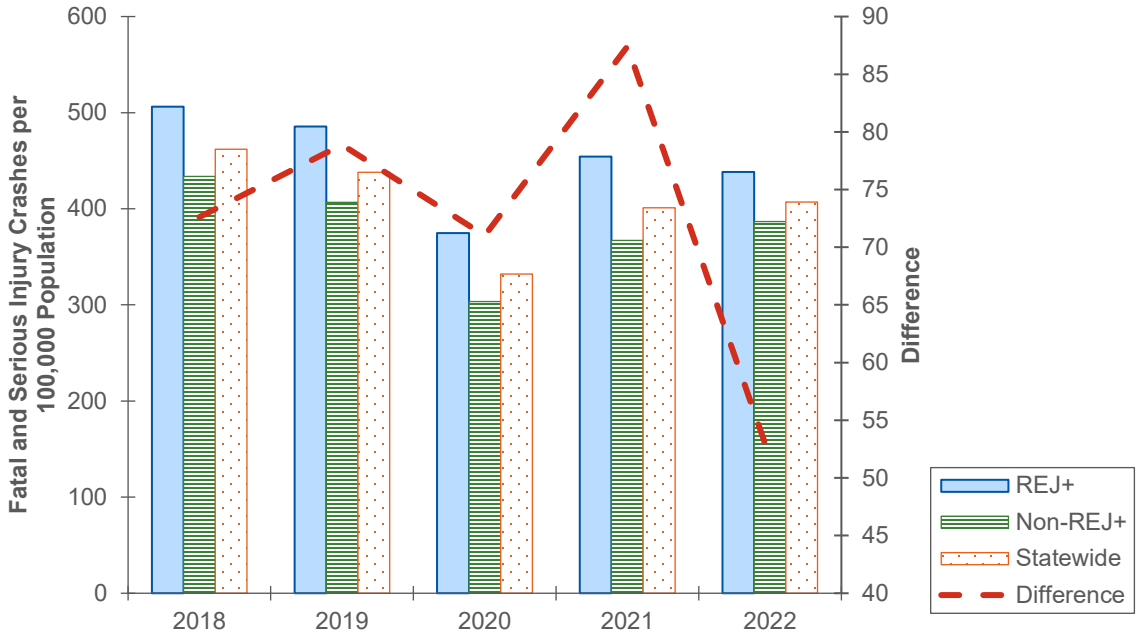
Table 2.4 and Figure 2.7 present the disparity between REJ+ and non-REJ+ communities as it relates to fatal and serious crashes per population. Overall, the fatal and serious injury crashes per population have decreased over the past five years of available data, as well as the gap between REJ+ and non-REJ+ communities. MassDOT would like to see fatal and serious injury crashes and the disparity between REJ+ and non-REJ+ communities continue to decrease over time.

Table 2.4 Fatal and Serious Vehicular Crashes per 100,000 Population in REJ+ and non-REJ+ Communities, 2018-2022

Years	REJ+	Non-REJ+	Difference[1]	Statewide
2018	506	433	73	462
2019	486	407	79	438
2020	375	304	71	332
2021	454	367	87	401
2022	438	387	52	407

[1] *Difference of REJ+ minus non-REJ+*

Figure 2.7 Fatal and Serious Vehicular Crashes per 100,000 Population in REJ+ and non-REJ+ Communities, 2018–2022



Measuring Over Time: Percent Difference in Roadway Risk Miles between REJ+ and non-REJ+ Communities

In addition to traditional crash-based screening, MassDOT also uses risk-based analysis. This analysis identifies locations with the highest risk of fatal and serious injury crashes for a number of emphasis areas of the Strategic Highway Safety Plan. An analysis of total roadway risk mile data was performed by assigning roadway risk segments to either REJ+ or non-REJ+ block groups based on their location. Then the percentages of total miles of roadway risk were compared per 100,000 population.

Figure 2.8 and Figure 2.9 present the disparity between REJ+ and non-REJ+ communities as it relates to miles of roadway risk and percentage of roadway risk miles per population for the current dataset. The miles of roadway risk per population remains consistent in REJ+ and non-REJ+ communities throughout the Commonwealth; however, a higher percentage of roadway miles are classified as high risk within REJ+ communities than non-REJ+ communities. The roadway risk segments are located throughout the state, with high concentrations within urban areas, such as Boston, Worcester, and Lowell, where there are also higher concentrations of REJ+ designated communities.

While the 2013-2017 data set is currently the only one available, more detailed analysis may be completed in the future as additional years of data become available. MassDOT would like to see the overall miles of roadway risk decrease over time, as well as see the disparity between REJ+ and non-REJ+ communities decrease over time.

Figure 2.8 Roadway Risk Miles per 100,000 Population in REJ+ and non-REJ+ Communities

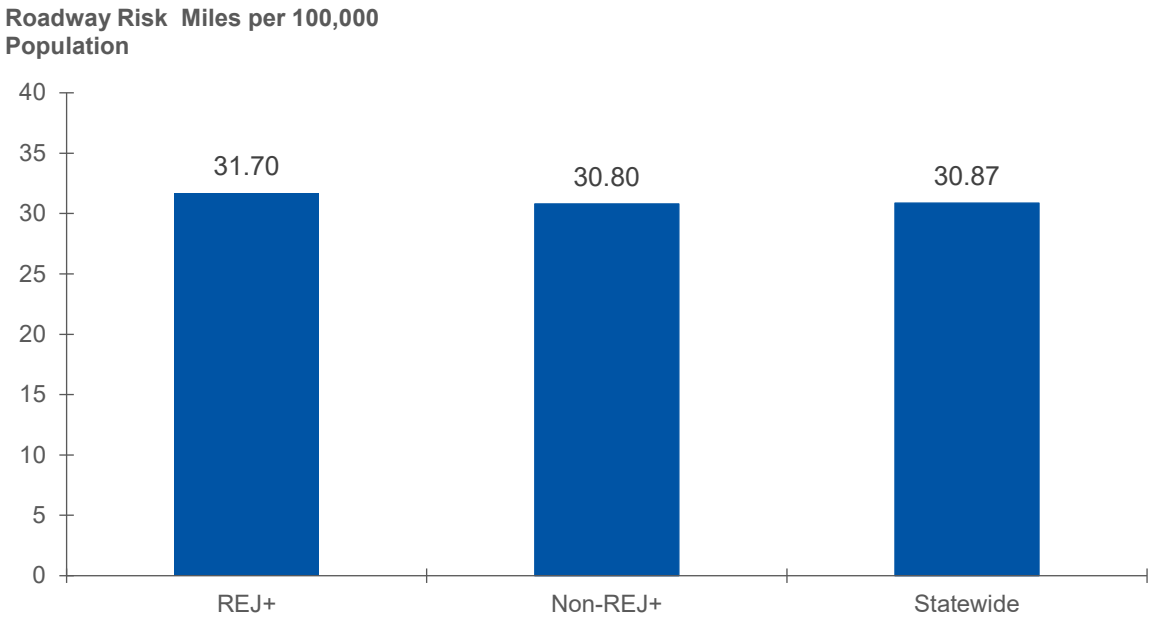
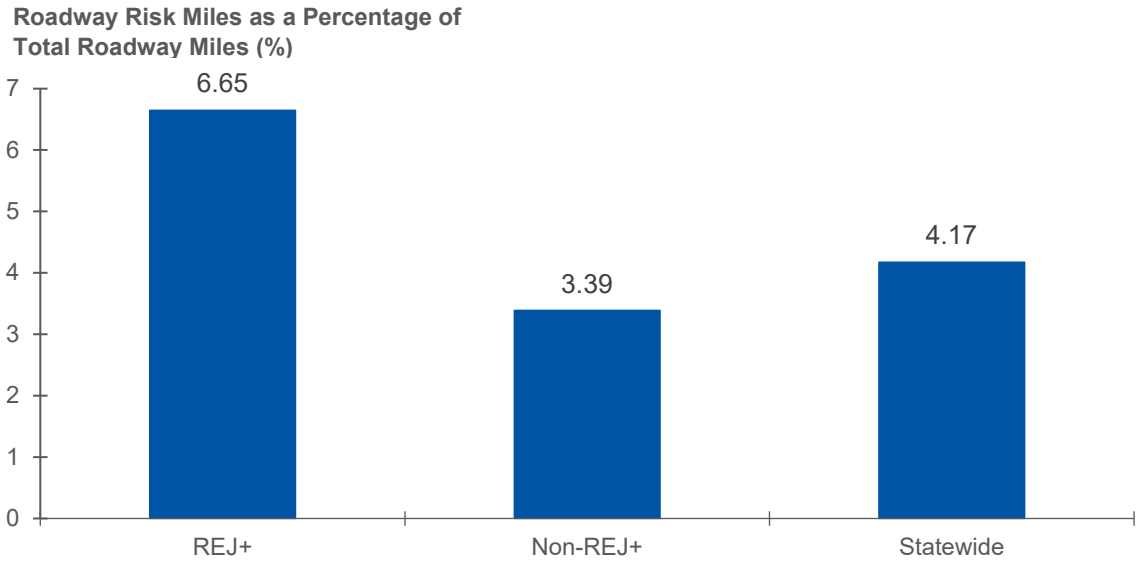


Figure 2.9 Roadway Risk Miles as a Percentage of Total Roadway Miles in REJ+ and non-REJ+ Communities



Measuring Over Time: Number of Fatalities on Principal or Minor Arterials

To contextualize progress toward addressing the problem statement that **Massachusetts traffic fatality rates have risen since 2019, despite lower vehicle miles traveled**, MassDOT has conducted an analysis of the number of fatalities on principal and minor arterial roadways for the years 2018 to 2022 using MassDOT's IMPACT portal and the state's authoritative Road Inventory File. As part of this analysis, fatal crashes were classified by the roadway facility they are located on, and then compared year over year.

Table 2.5 presents the number of fatal crashes that occurred on principal or minor arterials for the following three functional classifications: Rural or Urban Principal Arterial; Rural Minor Arterial or Urban Principal Arterial; and Urban Minor Arterial or Rural Major Collector. Over the past five years of available data, the total number of fatal crashes on these roadway classes has increased. MassDOT has a general goal of decreasing fatal collisions over time.

Table 2.5 Fatal Crashes on Arterial and Collector Roadways, 2018–2022

Years	Rural or Urban Principal Arterial Class[1] 2	Rural Minor Arterial or Urban Principal Arterial Class[1] 3	Urban Minor Arterial or Rural Major Collector Class[1] 5	Total
2018	35	65	103	203
2019	34	69	78	181
2020	36	73	97	206
2021	48	74	109	231
2022	60	73	116	249

[1] *Class is based on coding within MassDOT's Road Inventory Functional Classification.*

2.2 Transit Safety

49 CFR Section 673 requires Section 5307 recipient agencies to establish a *Public Transportation Agency Safety Plan* (PTASP), and mandates state DOTs to assist in the preparation of these plans for all small urban transit agencies. FTA established four performance measures to evaluate safety performance for transit agencies (for more detail on these measures, please refer to the National Transit Database (NTD) Safety and Security Policy Manual):[5]

- **Fatalities |** A reportable event that occurs at a transit revenue facility, maintenance facility, or rail yard, on transit right-of-way or infrastructure during a transit-related maintenance activity; or involves a transit revenue vehicle that results in a fatality. Fatalities that occur because of illnesses, drug overdoses, or other natural causes are not reportable. With one exception, RTAs' CY2021 performance was on target for fatalities.

- **Injuries |** A reportable event that occurs at a transit revenue facility, maintenance facility, or rail yard, on transit right-of-way or infrastructure during a transit-related maintenance activity; or involves a transit revenue vehicle that results in any damage or harm to persons that requires immediate medical attention away from the scene. Illnesses (e.g., seizure, heart attack) that require immediate medical attention away from the scene are not reportable. For the most part, RTAs' CY2021 performance was well below the target for reportable injuries.

- **Safety Events |** A collision, unsuppressed fire, hazardous materials spill, or natural disaster that occurs at a transit revenue facility, maintenance facility, or rail yard, on transit right-of-way or infrastructure during a transit-related maintenance activity; or involves a transit revenue vehicle that is inclusive of the following event types. For the most part, RTAs' CY2021 performance was well below the target for reportable safety events.

[5] https://www.transit.dot.gov/sites/fta.dot.gov/files/2022-02/2022%20Safety%20and%20Security%20Policy%20Manual%20Version%201.0_0.pdf.

- **Preventable Accidents per 100,000 Vehicle Revenue-Miles (VRM) |** The number of preventable crashes for every 100,000 revenue miles operated. A preventable accident is defined as a crash in which the transit personnel did not do everything reasonably expected to prevent the crash from occurring. For the most part, RTAs' FY2022 performance was well below the target for preventable incidents.

Table 2.6 provides the transit safety targets established by the MBTA and the RTAs. Note that these targets are updated annually. Figures 2.10 and 2.11 show the statewide RTA dashboard for safety measures on Fixed-Route and Demand Response modes, respectively.

Table 2.6 Targets for Transit Safety

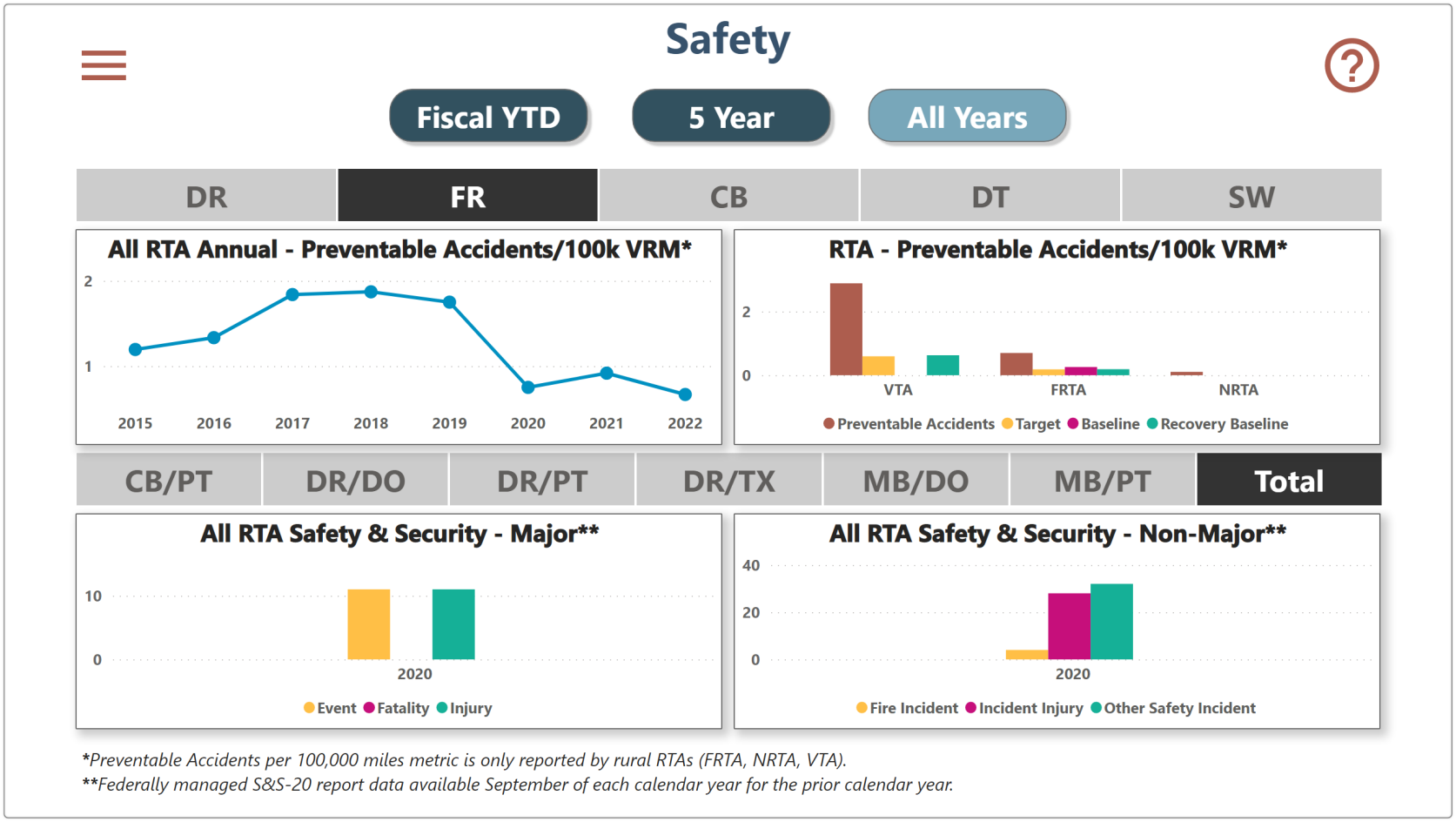
Agency Name (Year)	Mode	Fatalities (total)	Injuries (total)	Safety Events	Preventable Accidents per 100K VRM
MBTA (2023)	Heavy Rail	0.0	180.0	24.0	1.07
	Light Rail	0.0	79.0	27.0	4.94
	Bus	0.0	286.0	98.0	4.21
	The RIDE	0.0	27.0	20.0	1.74
BAT (2020)	Fixed-Route	0.0	10.0	6.0	4.6
	Demand Response	0.0	4.0	4.0	5.9
BRTA (2020)	Fixed-Route	0.0	4.0	3.0	3.2
	Demand Response	0.0	0.0	0.0	0.0
CATA (2023)	Fixed-Route	0.0	1.0	2.5	1.5
	Demand Response	0.0	1.0	2.5	1.0
CCRTA (2020)	Fixed-Route	0.0	8.0	16.0	1.2
	Demand Response (Paratransit)	0.0	4.0	8.0	0.2
	Demand Response (Taxi)	0.0	6.0	12.0	1.0
FRTA*	Fixed-Route	N/A	N/A	N/A	N/A
	Demand Response	N/A	N/A	N/A	N/A
GATRA (2020)	Fixed-Route	0.0	3.0	3.0	1.8
	Demand Response	0.0	2.0	2.0	1.3
LRTA (2021)	Fixed-Route	0.0	2.0	2.0	1.5
	Demand Response (Roadrunner)	0.0	1.0	1.0	2.4
	Demand Response (Council on Aging)	0.0	1.0	1.0	3.6
MART (2020)	Fixed-Route	0.0	5.0	5.0	7.5
	Demand Response	0.0	5.0	5.0	2.0

Agency Name (Year)	Mode	Fatalities (total)	Injuries (total)	Safety Events	Preventable Accidents per 100K VRM
MeVa (2019)	Fixed-Route	0.0	–	2.0	–
	Demand Response	0.0	–	2.0	–
MWRTA (2023)	Fixed-Route	0.0	12.0	15.0	1.25
	Demand Response	0.0	8.0	10.0	1.25
NRTA*	Fixed-Route	N/A	N/A	N/A	N/A
	Demand Response	N/A	N/A	N/A	N/A
PVTA	Fixed-Route	0.0	0.0	N/A	N/A
	Demand Response	0.0	0.0	N/A	N/A
SRTA (2022)	Fixed-Route	0.0	8.0	8.0	5.2
	Demand Response	0.0	1.0	1.0	1.9
VTA[1]	Fixed-Route	N/A	N/A	N/A	N/A
	Demand Response	N/A	N/A	N/A	N/A
WRTA (2020)	Fixed-Route	0.0	10.0	9.0	4.6
	Demand Response	0.0	1.0	1.0	0.8

[1] *FTA has deferred the requirement for the development of Public Transit Agency Safety Plans (PTASPs) for agencies that receive Federal funding only through the Enhanced Mobility of Seniors and Individuals with Disabilities Formula Program (Section 5310) and/or the Rural Area Formula Program (Section 5311).[6] Three RTAs in Massachusetts receive funds through Section 5311 only, and consequently they have not developed safety targets.*

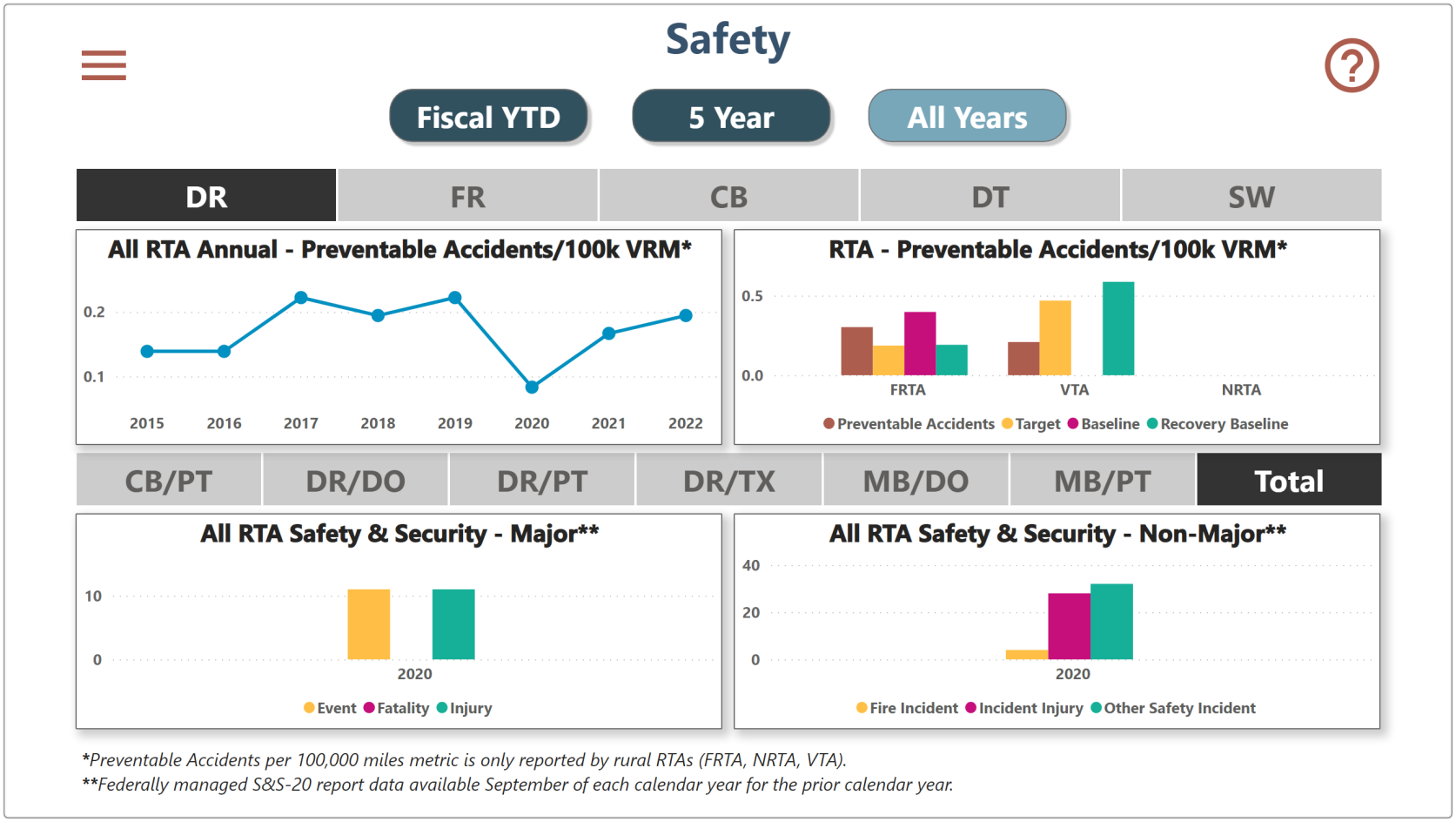
[6] https://www.transit.dot.gov/PTASP

Figure 2.10 RTA Performance Dashboard for Safety Measures on Fixed-Route, 2022



**Preventable Accidents per 100,000 miles metric is only reported by rural RTAs (FRTA, NRTA, VTA).*
***Federally managed S&S-20 report data available September of each calendar year for the prior calendar year.*

Figure 2.11 RTA Performance Dashboard for Safety Measures on Demand Response, 2022



**Preventable Accidents per 100,000 miles metric is only reported by rural RTAs (FRTA, NRTA, VTA).*
***Federally managed S&S-20 report data available September of each calendar year for the prior calendar year.*

3.0 Infrastructure Condition

3.1 Highway Infrastructure Condition

Effective May 20, 2017, FHWA established performance measures to assess pavement condition and bridge condition for the National Highway Performance Program.[7,8] This second FHWA performance measure rule (also known as "PM2") established six performance measures:

- Percent of Interstate pavements in good condition.
- Percent of Interstate pavements in poor condition.
- Percent of non-Interstate National Highway System (NHS) pavements in good condition.
- Percent of non-Interstate NHS pavements in poor condition.
- Percent of NHS bridges by deck area classified as in good condition.
- Percent of NHS bridges by deck area classified as in poor condition.

Condition of NHS Pavement

MassDOT manages just 13 percent of the Commonwealth's roads (9,600 out of 73,000 lane-miles), yet processes more than half of Massachusetts vehicle miles traveled. The MassDOT road network includes the Interstate system, freeways, and other major roadways that provide local, regional, and national connectivity.

MassDOT pavement is a significant Commonwealth asset. Pavement science and sustained investment ensure that the network remains safe and reliable at the least cost to the Commonwealth. The MassDOT Pavement Management Section operates a state-of-the-art vehicle that automatically collects pavement distress data, and informs a data-driven process to choose the "right treatment" at the "right time." Using current condition data, deterioration curves, and specialized software, MassDOT can interrogate various investment scenarios for consideration in the CIP.[9]

The Federal pavement condition measures are expressed as the percentage of both Interstate and non-Interstate NHS roads in good or poor condition according to an FHWA metric that incorporates International Roughness Index (IRI), several types of cracking, rutting, and raveling. Pavement in good condition suggests that no major investment is needed. Pavement in poor condition suggests major reconstruction investment is needed due to either ride quality or a structural deficiency.

7 23 CFR Part 490, Subpart C.
8 23 CFR Part 490, Subpart D.
9 2021 Performance & Asset Management Advisory Council Update, p. 2.

Condition of NHS Bridges

The definition of a bridge is a "structure of a span of 20 feet or greater"; there are approximately 5,260 examples meeting this criterion in Massachusetts. These are known as National Bridge Inventory (NBI) structures. MassDOT owns 3,494 of these structures, and also inspects the 1,646 municipally owned NBI structures. The sum of these two inventories, 5,140 structures, is the focus of the bridge program within the CIP. Of these, 2,298 structures are on the NHS.

Massachusetts bridges are 25 years older than the national average, which combined with unforgiving winters and traffic from an active and growing state, has resulted in a considerable repair backlog. Based on NBI data, Massachusetts ranks fourth worst in the nation for bridge condition on the NHS. Today's conditions reflect the $3 billion investment of the Accelerated Bridge Program (2008-2018), which rehabilitated or replaced nearly 300 bridges and forestalled a further decline of condition. However, a significant investment is needed to rehabilitate or replace legacy infrastructure and sufficiently fund maintenance and preservation.[10]

The bridge condition measures represent the percentage of bridges, by deck area, on the NHS that are in good condition or poor condition. The condition of each bridge is evaluated by assessing four primary bridge components: deck, superstructure, substructure, and culverts. FHWA created a metric rating threshold for each component to establish good, fair, or poor condition, as shown in Figure 3.1.

Figure 3.1 NBI Condition Rating Scale

Name	Score	Description
Good	9	Pristine condition.
	8	No problems noted.
	7	Insubstantial flaws.
Fair	6	Minor deterioration.
	5	Elements sound, some defects.
Poor	4	Advanced defects.
	3	Local failures, cracking begins.
	2	Support failure, closure possible.
	1	Elements moving, bridge closed.
	0	Out of service, beyond repair.

Every bridge on the NHS is evaluated using these component ratings. If the lowest rating of the four metrics is greater than or equal to seven, the structure is classified as good. If the lowest rating is less than or equal to four, the structure is classified as poor. If the lowest rating is five or six, it is classified as fair.

To determine the percent of bridges in good or poor condition, the sum of total deck area of good or poor NHS bridges is divided by the total deck area of bridges carrying the NHS. Deck area is

[10] 2021 Performance & Asset Management Advisory Council Update, p. 3.

computed using structure length and either deck width or approach roadway width. Good condition suggests that no major investment is needed. Bridges in poor condition are safe to drive on; however, they are nearing a point where substantial reconstruction or replacement is needed.

Highway Infrastructure Condition Targets

Table 3.1 presents performance for the PM2 measures for the 2021 baseline year, as well as the current two-year and four-year statewide targets established by MassDOT. All of the performance measures and targets provided in Table 3.1 are tracked in greater detail in MassDOT's 2022 *Transportation Asset Management Plan* (TAMP).[11]

Table 3.1 Targets for Highway Infrastructure Condition, 2021-2025

Performance Measure	Current (2021)	2-Year Target (2023)	4-Year Target (2025)
Bridges in Good Condition	16%	16%	16%
Bridges in Poor Condition	12.2%	12%	12%
Interstate Pavement in Good Condition	71.8%	70%	70%
Interstate Pavement in Poor Condition	0%	2%	2%
Non-Interstate Pavement in Good Condition	34%	30%	30%
Non-Interstate Pavement in Poor Condition	3%	5%	5%

3.2 Transit Asset Management

Under the TAM Final Rule, FTA established four performance measures to approximate the State of Good Repair (SGR) for four categories of capital assets. Calculating performance measures helps transit agencies to quantify the condition of their assets, which facilitates setting targets that support local funding prioritization.[12]

- **Rolling Stock |** Percentage of revenue vehicles (e.g., buses, vans, cars, railcars, locomotives, trolley cars and buses, and ferry boats) exceeding useful life benchmark (ULB). A ULB is defined as the expected lifecycle of a capital asset—or the acceptable period of use in service—for a particular transit provider's operating environment.

- **Equipment |** Percentage of non-revenue service vehicles (e.g., automobiles, trucks, or steel wheel vehicles used by supervisors or maintenance staff) exceeding ULB.

- **Facilities |** Percentage of facilities rated under 3.0 on the TERM scale. FTA uses the five-point Transit Economic Requirements Model (TERM) scale to rate the condition of all passenger

11 https://www.mass.gov/lists/massdot-asset-management.
12 https://www.transit.dot.gov/PerformanceManagement.

facilities used in revenue service as well as administrative and maintenance facilities for which the agency has a capital responsibility. A score of 0 is failure while 5 is new.

- **Infrastructure |** Percentage of track segments under performance restriction.

More detail on the MBTA's asset management practice can be found in the agency's *Transit Asset Management Plan*.[13] More detail on asset management performance for the RTAs can be found in the Annual Report on the Regional Transit Authority Performance Management Program, most recently published December 31, 2022.

Transit Asset Management Targets

Tables 3.2 through 3.4 provide the transit asset management targets established by the MBTA and the RTAs. Note that these targets are updated annually.

[13] https://cdn.mbta.com/sites/default/files/2022-11/2022-11-17-transit-asset-management-plan.pdf.

Table 3.2 Targets for Transit Asset Management—Revenue Vehicles, 2022

Agency Name	Bus	Cutaway	Minivan	Van	Over-the-Road Bus	Automobile	Articulated Bus
MBTA[1]	25.00%	N/A	N/A	19.00%	N/A	50%	30%
BAT	8.00%	25.00%	N/A	13.00%	N/A	N/A	N/A
BRTA	0.00%	30.00%	0.00%	N/A	N/A	N/A	N/A
CATA	40.00%	0.00%	N/A	N/A	N/A	N/A	N/A
CCRTA	0.00%	10.00%	0.00%	N/A	N/A	N/A	N/A
FRTA	0.00%	0.00%	N/A	0.00%	N/A	N/A	N/A
GATRA	24.00%	10.00%	N/A	34.00%	N/A	N/A	N/A
LRTA	5.00%	35.00%	0.00%	N/A	N/A	N/A	N/A
MVRTA	10.00%	20.00%	N/A	0.00%	N/A	N/A	N/A
MWRTA	17.00%	0.00%	N/A	N/A	33.00%	N/A	N/A
MART	N/A	25.00%	N/A	0.00%	N/A	0.00%	N/A
NRTA	0.00%	N/A	N/A	0.00%	N/A	N/A	N/A
PVTA	32.00%	39.00%	N/A	N/A	N/A	N/A	0.00%
SRTA	25.00%	25.00%	N/A	N/A	N/A	N/A	N/A
VTA	3.00%	0.00%	0.00%	0.00%	N/A	N/A	N/A
WRTA	22.64%	36.84%	100.00%	13.00%	N/A	N/A	N/A

[1] *MBTA Targets were set for 2021. RTA targets were set for 2022.*

Table 3.3 Targets for Transit Asset Management – Equipment and Facilities, 2022

Agency Name	Automobiles	Trucks and Other Rubber-Tired Vehicles	Passenger/Parking Facilities	Administrative/Maintenance Facilities
MBTA[1]	45.00%	27.00%	7.00%	45.00%
BAT	33.00%	37.50%	0.00%	0.00%
BRTA	100.00%	100.00%	0.00%	0.00%
CATA	N/A	100.00%	N/A	0.00%
CCRTA	0.00%	10.00%	0.00%	0.00%
FRTA	66.00%	85.00%	N/A	100.00%
GATRA	0.00%	14.00%	0.00%	0.00%
LRTA	33.33%	75.00%	0.00%	0.00%
MVRTA	N/A	17.00%	0.00%	0.00%
MWRTA	0.00%	8.33%	0.00%	0.00%
MART	N/A	50.00%	N/A	0.00%
NRTA	N/A	0.00%	N/A	0.00%
PVTA	100.00%	27.00%	0.00%	0.00%
SRTA	50.00%	50.00%	0.00%	0.00%
VTA	0.00%	N/A	0.00%	0.00%
WRTA	50.00%	75.00%	0.00%	0.00%

[1] *MBTA Targets were set for 2021. RTA targets were set for 2022.*

4.0 System Performance

4.1 Highway System Performance

Effective May 20, 2017, FHWA established measures to assess performance of the National Highway System, freight movement on the Interstate system[14], and the Congestion Mitigation and Air Quality Improvement (CMAQ) Program[15]. This third FHWA performance measure rule (PM3) established six performance measures, described below.

- **NHS Performance:**
  - Percent of person-miles traveled (PMT) on the Interstate system that are reliable.
  - Percent of PMT on the non-Interstate NHS that are reliable.
- **Freight Movement on the Interstate:**
  - Freight Reliability index derived from Truck Travel Time Reliability (TTTR).
- **Congestion Mitigation and Air Quality Improvement (CMAQ) Program:**
  - Annual hours of peak hour excessive delay per capita (PHED).
  - Percent of non-single occupant vehicle travel (Non-SOV).
  - Cumulative two-year and four-year reduction of on-road mobile source emissions for CMAQ funded projects (CMAQ Emission Reduction).

Reliability

Reliability in general represents how much extra time a traveler needs to plan for when making a trip. If it takes the traveler 30 minutes to make a trip on a typical day, but once per week it takes an hour, the traveler will need to plan 30 minutes extra into their trip to be guaranteed to make it in time. Level of Travel Time Reliability (LOTTR) represents the additional time needed to make a trip versus the normal travel time. In this case, the LOTTR would be 2.0, i.e., 60 minutes divided by 30 minutes.

The PM3 reliability measure for general travel is defined as the percent of PMT statewide that are "reliable" based on the results of the LOTTR calculation. LOTTR is the ratio of the 80th percentile travel time to the 50th percentile travel time over the course of a year. Average travel time data are collected every 15 minutes during all time periods other than 8 PM to 6 AM local time. A segment of the highway system is reliable if all the periods have an LOTTR that is less than 1.50. PMT for a

14 23 CFR Part 490, Subpart F.
15 23 CFR Part 490, Subparts G and H.

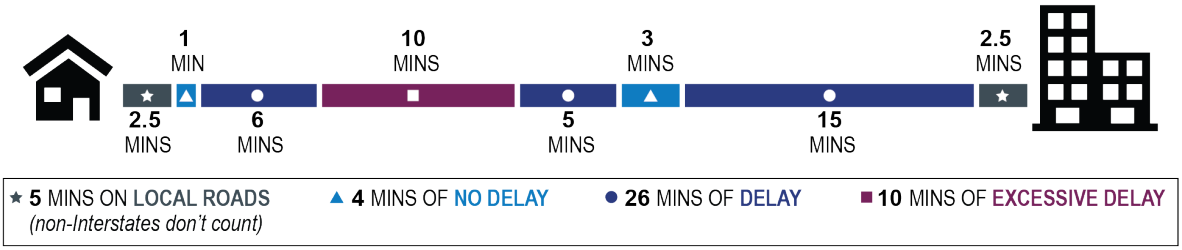
segment is computed by multiplying the Annual Average Daily Traffic (AADT) on a segment by vehicle occupancy and length.

TTTR is the ratio of the 95th percentile travel time to the 50th percentile travel time for trucks on a segment, or the longest travel time versus normal travel time. Freight Reliability is derived from TTTR for five time periods on Interstate segments: AM peak, midday, PM peak for weekdays, weekends, and overnight for all days. The measure is a weighted average of the Interstate system by length—a segment's highest value across the five periods is multiplied by the segment's length. The sum of all of these across the Interstate system is divided by the system's total length. The period with the worst TTTR will vary by segment. On less congested segments, the TTTR may occur overnight if trucks reduce speed in darkness.

Delay

Excessive delay means travel times that are longer than normal. More specifically, it means that travel times exceed a specific travel time threshold (the greater of either (a) 60 percent of posted limit or (b) 20 mph), as illustrated in Figure 4.1.

Figure 4.1 Excessive Delay Map for a Hypothetical Trip[16]



PHED quantifies the hours of delay resulting from traffic congestion on the NHS during morning and afternoon weekday peak travel times. Peak travel hours are defined as 6 AM to 10 AM on weekday mornings, and either 3 PM to 7 PM or 4 PM to 8 PM on weekday afternoons in 15-minute intervals. PHED is weighted by vehicle volumes and occupancy and is expressed as the annual hours of excessive delay during the peak hours on a per capita basis.

As an example: in a two-person household, Daniel drops off and picks up his toddler, Katy, at daycare on his drives to and from work.[17]

- Daniel and Katy represent two person-trips. Their trip each direction takes 36 minutes, of which six minutes are spent on local streets and 30 minutes are spent on a major highway with a 65-mph speed limit.

16 FHWA.
17 Adapted from NJTPA resource "Peak Hour Excessive Delay per Capita (PHED)." https://www.youtube.com/watch?v=mXTGteSlVU8.

- Of the 30 minutes of the trip on the major highway, 17 minutes are spent traveling at 65 mph or higher, eight are spent traveling at 40 mph or higher, and five are spent traveling at less than 39 mph (60 percent of the speed limit).

- Daniel and Katy experience five minutes of excessive delay per trip. Two trips per day and two people in the car gives their family unit 20 person-minutes per day. Following this routine 240 days per year gives them 80 person-hours per year, or 20 hours of PHED.

Applicability of the CMAQ Measures

The PHED and Non-SOV measures apply only within the boundaries of an urbanized area (UZA) that contains an NHS road, has a population of more than 250,000, and contains any part of a non-attainment or maintenance area for ozone, carbon monoxide, or particulate matter. States and MPOs with planning boundaries that are within any part of the applicable UZA must coordinate to set a single, unified four-year PHED target for the entire UZA, and single, unified two- and four-year targets for Non-SOV travel. The percentage of non-SOV travel is approximated using the U.S. Census Bureau's American Community Survey (ACS) Journey-to-Work data. This metric is based on the percentage of people commuting to work using a mode other than a single occupancy vehicle.

In Massachusetts, the PHED and Non-SOV measures apply to the Boston, Worcester, and Springfield UZAs. The majority of Massachusetts MPOs fall into one of these UZAs, and all three of them cross state lines – the Boston UZA is shared with New Hampshire and Rhode Island, while the Worcester and Springfield UZAs are shared with Connecticut. Memoranda of Understanding between MassDOT, New Hampshire DOT, Connecticut DOT, Rhode Island DOT, and MPOs overlapping the UZA on both sides of the border guide a collaborative process for setting a single set of targets for the UZA.[18,19,20]

Emissions reduction targets are measured as the sum total of all emissions reductions anticipated through CMAQ-funded projects in non-attainment or air quality maintenance areas (currently the cities of Lowell, Springfield, Waltham, and Worcester, and the town of Oak Bluffs) identified in the *Statewide Transportation Improvement Program* (STIP). This anticipated emissions reduction is calculated using the existing CMAQ processes.

18 https://www.ctps.org/data/calendar/pdfs/2020/MPO_0107_Providence_UZA_MOU.pdf.
19 https://www.ctps.org/data/calendar/pdfs/2020/MPO_0107_Worcester_UZA_MOU.pdf.
20 https://pvmpo.pvpc.org/wp-content/uploads/2021/10/2020-Springfield-MA-CT-UZA-MOU-Final.pdf.

Highway System Performance Targets

Table 4.1 presents performance for the PM3 measures for the 2021 baseline year, as well as the current two-year and four-year statewide targets established by MassDOT.

Table 4.1 Targets for Highway Infrastructure Condition, 2021-2025

Performance Measure	Current (2021)	2-Year Target (2023)	4-Year Target (2025)
Percent of Person-Miles on the Interstate System that are Reliable	84.2%	74.0%	76.0%
Percent of Person-Miles on the Non-Interstate NHS that are Reliable	87.2%	85.0%	87.0%
Freight Reliability Index Derived from Truck Travel Time Reliability	1.61	1.80	1.75
Annual Hours of Peak Hour Excessive Delay per Capita (PHED) – Boston UZA	18.0	24.0	22.0
Annual Hours of Peak Hour Excessive Delay per Capita (PHED) – Worcester UZA	6.2	6.5	6.0
Annual Hours of Peak Hour Excessive Delay per Capita (PHED) – Springfield UZA	6.8	7.0	5.0
Percent Non-SOV Travel – Boston UZA	36.9%	38.8%	39.8%
Percent Non-SOV Travel – Worcester UZA	21.5%	22.2%	22.2%
Percent Non-SOV Travel – Springfield UZA	23.4%	25.4%	26.1%
CMAQ PM2.5 Cumulative Emission Reductions	N/A	N/A	N/A
CMAQ NOx Cumulative Emission Reductions	0.490	0.000	0.000
CMAQ VOC Cumulative Emission Reductions	0.534	0.000	0.000
CMAQ PM10 Cumulative Emission Reductions	N/A	N/A	N/A
CMAQ CO Cumulative Emission Reductions	6.637	0.354	0.354

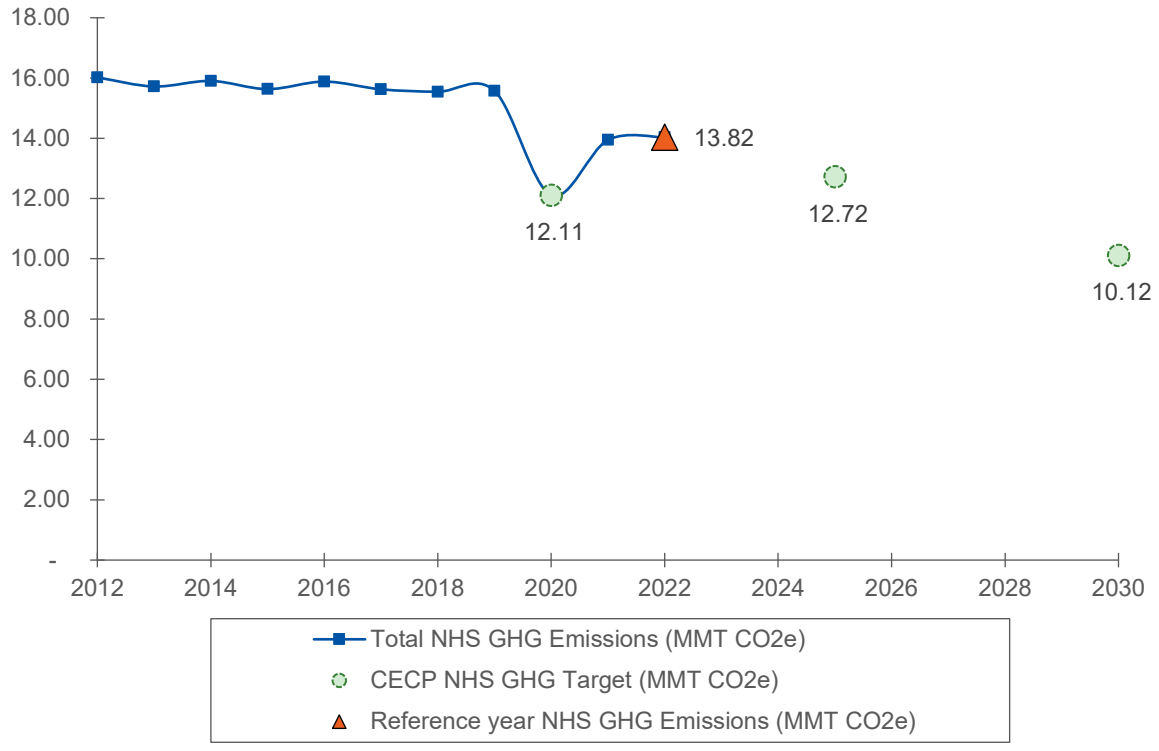
5.0 Greenhouse Gas (GHG) Emissions

To help address the climate crisis, in 2023, FHWA amended its regulations governing national performance management measures to require State DOTs and MPOs to establish declining carbon dioxide (CO2) targets and to establish a method for the measurement and reporting of greenhouse gas (GHG) emissions associated with transportation under the Highways title of the United States Code (U.S.C.).

MassDOT reported an initial four-year state target in the area of GHG emissions reduction to USDOT in February 2024 in response to this requirement. The reporting of this measure will follow an October 1 cycle beginning in 2026 to align with other national performance management reporting requirements.

Figure 5.1 below shows MassDOT's target of a 7.9 percent decrease in GHGs, as measured in MMT CO2e1 (1 million metric tons of carbon-dioxide equivalent) from the 2022 reference year to be consistent with state targets reported in Massachusetts' *Clean Energy and Climate Plan for 2025 and 2030.*

Figure 5.1 MassDOT's Four-Year GHG Emissions Reduction Target



6.0 Other Performance Measures

6.1 Measuring Over Time: Difference in Travel Times Between White and Non-White Commuters

A key Problem Statement under the Destination Connectivity Priority Area is that **people living in historically marginalized communities are burdened by connectivity inequities across transportation systems, limiting their access to opportunities.** In order to contextualize progress toward this goal, MassDOT has conducted a longitudinal analysis of the difference in travel time across all modes between white and non-white commuters using Census data from the years 2017 to 2021. These results were developed through the Census's Microdata Access Tool (MDAT), which leverages microdata and cross tabulation to create customized data tables. Using MDAT, commuting time could be grouped by survey respondents who identified as "White, non-Hispanic" and those who did not.

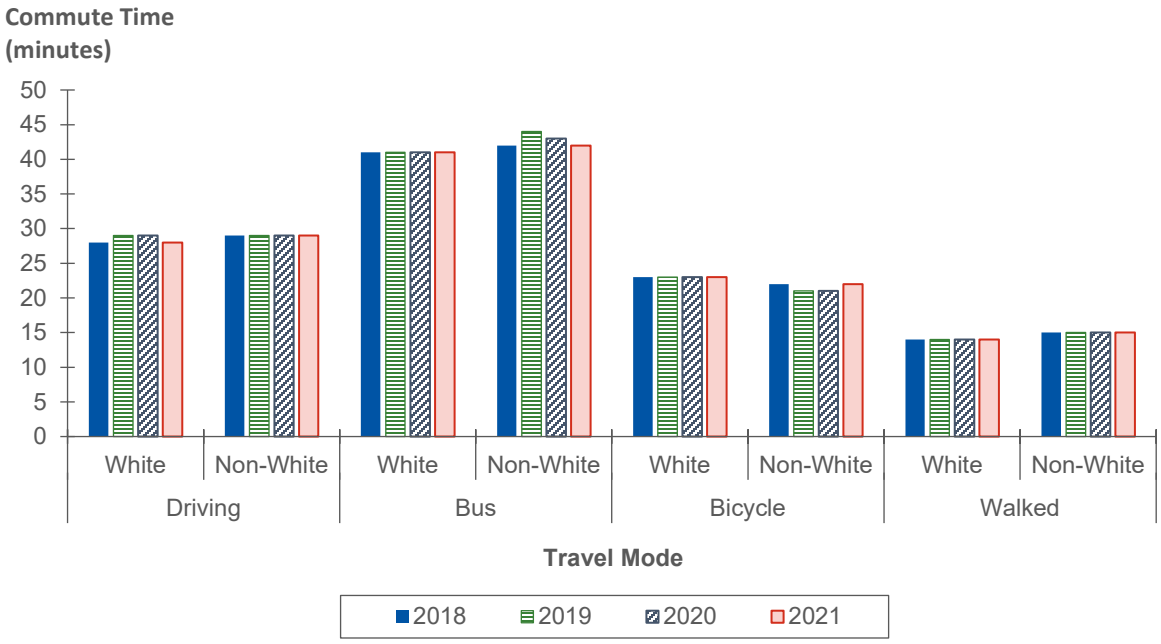
Table 6.1 presents the difference in average commute time on a per-trip basis between white and non-white residents over time (in minutes). Figure 6.1 presents the average commuting time itself in these categories. Although these travel time differences appear small, the 'penalty' assumed by non-white commuters accumulates over time; 2021 data suggests that the annual travel time 'penalty' for non-white commuters traveling via car, bus, or on foot is equivalent to over eight 'lost' hours per year. MassDOT would like to see there be no disparities in commuting time across demographic groups.

Table 6.1 Difference in Commuting Time Between White and Non-White Residents, 2018-2021 (minutes)

Mode	2018	2019	2020	2021
Driving	1	0	0	1
Bus	1	3	2	1
Bicycle	-1	-2	-2	-1
Walking	1	1	1	1

Note: Positive values indicate time penalty for Non-white commuters. Negative value indicates time savings for non-white commuters.

Figure 6.1 Difference in Commuting Time Between White and Non-White Residents, 2018-2021



6.2 Measuring Over Time: Percent of Residents Who Drive Alone to Work

Another key Problem Statement in the Destination Connectivity Priority Area is that **though reduced car travel is a desired and crucial step toward decarbonization, Massachusetts community members find it difficult to get around using other modes including transit.** In order to contextualize progress toward addressing this issue, MassDOT has conducted a longitudinal analysis of the percent of residents who drive alone to work using Census data for the past five American Community Survey (ACS) datasets.[21] The analysis was conducted for three Urbanized Areas (UZAs) within Massachusetts (Boston-Cambridge-Newton, Worcester, and Springfield) as well as for statewide to understand general regional trends. The percentage of residents who drive alone to work was calculated by comparing the total number of residents who drive alone to the total working age population in the geographic region.

Table 6.2 presents the percent of residents who drive to work for the UZAs and statewide regions. This percentage has remained relatively stable over the past five available datasets. MassDOT has a goal of decreasing this percentage over time. The table also indicates that residents in the Worcester and Springfield urban areas have a higher percentage of residents that drive alone to work. This could indicate that there are fewer desirable options for multimodal access compared to Boston urban area residents.

[21] ACS averages are for 2013–2017, 2014–2018, 2015–2019, and 2016–2020.

Table 6.2 Percent of Residents Driving Alone to Work by Urbanized Area, 2013-2020

ACS 5-Year Period	Boston	Springfield	Worcester	Statewide
2013-2017	70.8%	83.0%	85.2%	74.3%
2014-2018	70.4%	83.1%	85.1%	73.9%
2015-2019	70.1%	83.2%	85.0%	73.7%
2016-2020	70.6%	83.6%	84.7%	74.1%

Note: Based on the population of working age residents (aged 15-64), not total population.

6.3 Data Sources for Longitudinal Analysis

Table 6.3 lists data sources used in longitudinal analysis throughout the document.

Table 6.3 Data Sources Used in Longitudinal Analysis

Data	Source	Used In
Massachusetts Urban Areas	MassGIS	All
Massachusetts State Boundary	MassGIS	All
REJ+ (with and without Dominant Factor)	GeoDOT	All
Census 2020 Block Groups	MassGIS	All
Census 2020 Population	Census	All
MassDOT Crash Inventory (Fatal/Serious Crashes & Pedestrian/Bicycle Crashes)	GeoDOT	Safety
HSIP Crash Clusters (Pedestrian)	GeoDOT	Safety
Roadway Risk (Total Risk)	GeoDOT	Safety
Roadway Functional Classification	Road Inventory - GeoDOT	Safety
Means of Transportation to Work	Census Table B08301	Connectivity & Accessibility
Average Commuting Time by Race	Census Table S0802	Connectivity & Accessibility
MBTA 2008-2009 Systemwide Passenger Survey	MBTA	Travel Experience
MBTA 2015-2017 Systemwide Passenger Survey	MBTA	Travel Experience
MBTA 2022 Systemwide Passenger Survey	MBTA	Travel Experience

Thank you

July 2024

Beyond Mobility

Massachusetts 2050 Transportation Plan

Appendix E

Draft Report Comments and Responses

1.1 Summary of Sources of Comments Received

The 60-day public comment period for Beyond Mobility ran from April 1st, 2024 through May 31st, 2024. During that time, 509 total comments were received through the following means:

- Individual letters
- The Beyond Mobility online comment form
- The Beyond Mobility email address (both individual comments and advocacy "action alert" comments)

The table below summarizes the number of comments by each source. The remainder of this document provides the full text all comments received, as well as MassDOT's responses. All comments received were analyzed by MassDOT staff and coded into categories using an intercoder reliability process to ensure that the same considerations were made by all staff involved in coding comments.

Table 1 Summary of Sources of Comments Received

Format	Affiliation/ Organization	Count	Summary of Comments
Letter	495/MetroWest Partnership	1	• Support for emphasis on issues such as reliability, destination connectivity, and safety in Beyond Mobility as well as the consideration increasing transit connections among more rural communities • Support for improved travel experience across all modes and request to prioritize the affordability and competitiveness of Commuter Rail trips
Letter	A Better City	1	• Support for performance-based planning approach and request to move toward more quantifiable targets, particularly in the areas of vehicle miles traveled (VMT) reduction and traffic-related fatalities • Request for clear statements committing MassDOT to facilitate mode shift
Letter	Berkshire Regional Planning Commission	1	• Increased emphasis on the importance of expanding passenger rail and improved connectivity in rural communities • Several suggestions for action item and problem statement edits (e.g. importance of improvements to electrical grid occurring in advance of when they are needed)
Letter	City of Lowell / UMass Lowell (Joint Letter)	1	• Broad support for the Beyond Mobility plan and framework established as it is consistent with many City and UMass goals
Letter	Conservation Law Foundation / TransitMatters (Joint Letter)*	1	• Requests for VMT reduction targets, more detailed commitments to Vision Zero and mode shift, more emphasis on regional rail, and the alignment of land use policy and transportation planning.

Format	Affiliation/ Organization	Count	Summary of Comments
Letter	Nantucket Planning & Economic Development Commission	1	• Request to document existing conditions of all statewide transportation facilities • Consideration of "Affordability" as a Priority Area • Increased emphasis on ferry operations, aviation, and freight
Letter	Pioneer Valley Planning Commission	1	• Increased emphasis on the importance of expanding passenger rail and improved connectivity and affordability in rural communities and for RTA riders • Request for scenarios on potential GANs repayment schedules that may have been considered or could be required based on future need.
Letter	Rural Policy Advisory Commission	1	• Request for more specificity on the definition of "rural" • Request to reference Chapter 90 and geographic equity implications • Increased emphasis on the importance of expanding passenger rail and improved connectivity and affordability in rural communities and for RTA riders
Beyond Mobility Online Comment Form	Members of the Public	126	• Comments coded into themes (see remainder of document)
Beyond Mobility Email Address (Individual)	Members of the Public	9	• Comments coded into themes (see remainder of document)
Beyond Mobility Email Address (Advocacy Action Alert)	Members of the Public	366	• Requests for VMT reduction targets, more detailed commitments to Vision Zero and mode shift, more emphasis on regional rail, and the alignment of land use policy and transportation planning.
	TOTAL	509	

*The letter submitted by the Conservation Law Foundation and Transit Matters was co-signed by representatives of Transportation for Massachusetts (T4MA), Alternatives for Community and Environment (ACE), WalkMassachusetts, the Acadia Center, LivableStreets Alliance, Sierra Club Massachusetts, Transportation Working Group (350 Mass), Stavros Center for Independent Living, Public Health Institute of Western Massachusetts, Safe Roads Alliance, Massachusetts Bicycle Coalition, CALSTART, Newton EV Task Force, Neighbor to Neighbor (N2N), the Capital Investment & Finance Subcommittee of the MBTA Rider Oversight Committee, Somerville Alliance for Safe Streets, League of Women Voters of Massachusetts, Black Economic Council, IBEW Local 103, and the Union of Concerned Scientists.

1.2 Action Orientation

Thank you to those who provided comments related to making sure the Beyond Mobility plan is action-oriented. The final plan contains nearly 100 action items and an online Action Items Progress Report has been developed to track progress on these actions (https://beyond-mobility-massdot.hub.arcgis.com/pages/action-items-progress). Additionally, MassDOT is undertaking a Strategic Business Plan to ensure the accountable departments have appropriate organizational capacity to deliver the items. Taken together, these efforts will ensure that accountability and sufficient resources are in place to advance the Action Items and priorities documented in Beyond Mobility.

Table 2 Comments on Action Orientation

Comment Number	Comment
1	Stop spending so much time on feedback and just build the darn system people are asking for. Per your survey, we want more frequent, reliable transit. Less focus on auto-centrism. Better street safety. These happen to also be environmentally friendly options. Stop wasting time and money, just do it. Build now. Have some urgency.
2	I love the plan. I would just try to really encourage the plan to be as actionable as possible. It feels like we often have plans in Mass that state a goal to improve biking, transit, walking, etc, and acknowledge the car-dominated ecosystem, but then the status quo largely continues. Having clear and aggressive direction and actions related to reducing vehicle miles traveled overall would be the best and boldest approach to take from this. Otherwise all the great vision and tactics will fall on deaf ears
3	Please remove the explore from "Explore options," "Explore creation," "Explore investments" Etc. and explicitly commit to doing those things: Expand regional rail services. Create a funding program for transit priority projects on municipal roadways. Invest in multimodal freight movement. Actually do it.
4	Fix what you should be fixing now
5	I'm concerned that the current plan does not feature enough specific and measurable actions for the state, leading to little accountability.
6	I'm going to echo the feedback provided by TransitMatters and other advocacy organizations -- the goals in "Beyond Mobility" are meaningless without measurable benchmarks for, at minimum, a reduction in statewide VMT, transit service increases across all modes, and a commitment to vision zero. Please include these things in future versions of Beyond Mobility.
7	Honestly, transportation in Massachusetts is a mess. In fact, living in a car free household (by choice) and dealing with the terrible state of our public transportation system has made me and my husband reconsider living in this state. Unfortunately, this plan does little to help me feel optimistic. While I agree with many of your priorities and vision statements, I do not see any concrete ways you will achieve this given the state of our system today: laughable safety for pedestrians and cyclists, extremely unreliable public transit, stubborn refusal to invest in clean transit i.e. electrification (bus depot rebuilds delayed and unfunded, regional rail plan with electrification unfunded and flirting with gadgety new technology rather than doing what every other system in the world is doing, even ripping out overhead wires for the bus system) and the travel experience is, of course, as poor as you would expect from a system that has been left to rot for 30 years. Your plan, however well-intentioned, seems to beat around the bush constantly and tries to avoid even the slightest suggestion that a single person may be inconvenienced or required to change their behavior. Explore options to expand regional rail services..... (how else are you going to achieve mode shift?)

Comment Number	Comment
	Address systemic issues that lead to rapid transit delays... (what does that even mean?) etc etc All of this means nothing. Explore options, consider etc.... We need action. We need rail electrification, subway extensions, better bus, even entirely new subway lines, we need it all and if this state is too scared to even say those things and make concrete goals then, of course nothing will happen, and in 2043 people will wonder why nothing has changed. And so slowly, gradually those of us who have a choice on where to live will start to look at places that can not only have visions but actually create concrete plans. Maybe you should take a look at Toronto, for example, where the region (only slightly bigger than Boston) identified public transportation needs and then funded them. So the citizens of that city and region can look forward to a steady improvement of better service, expanded routes and services, public transit gaps filled with high quality service. And cities around the globe including US cities like Seattle and LA are doing the same sometimes building entirely new systems where nothing exists. But no, it seems we don't have any ambition here just a vague vision board. Please do better.
8	Page 109, Problem Statement 1 Action Items fail to reflect problem statement detailed needs (page 78), including "improvements in network connectivity and coverage" and "the importance of microtransit and/or first and last mile connections to fixed route transit." Expanding network connectivity will require additional Action Items to facilitate inter-district rides (as reflected in FY25 Senate Ways and Means budget), and to add coverage to areas where public transit is not currently available.
9	While I appreciate the effort put into identifying immediate action items in the plan, it lacks a bold and visionary approach necessary for the future of transportation in our state. Specifically, the plan falls short in setting concrete goals and holding the agency accountable for achieving them. Without clear targets, measuring progress and ensuring the plan effectively addresses critical issues such as climate change, safety, and equity becomes challenging.
10	Even if MassDOT believes that they should pursue different goals, at the very least those goals should be explicitly stated in a measurable way. I believe that MassDOT is moving in the right direction on the type of projects it is pursuing. However, it will be impossible to say if they fall short of Beyond Mobility, because there are exceedingly few concrete goals. Since junior high, I have been told to right "SMART" goals: specific, measurable, achievable, relevant, and time-bound. This information is necessary to both track progress on goals, and know when you come up short. The least MassDOT could do in a final Beyond Mobility report is use a similar framework to provide measurements and timelines by which they will assess their progress on the goals set out.
11	Page 153 suggests a lack of vision in this document, describing Action Items in Chapter 5 as "ongoing activities, projects, and programs that MassDOT and the MBTA are already involved in that address these needs. Although current initiatives represent great progress, we know there is more work to do." Overall, this project seems to identify resident priorities and describe what MassDOT already does, without proposing Action Items that would address gaps between needs and existing activities.
12	On page 153, "MassDOT encourages all Massachusetts communities to use this Plan as a call to action to highlight key problems and serve as a foundation for ongoing planning, research, and advocacy." As the state's lead agency managing how people get from place to place, where does the next available state-level dollar need to go to improving it? Can this conclusion highlight what unfunded or underfunded ideas would make the best bang-for-buck improvements in resident satisfaction with the state transportation system?

1.3 Safe Bicycle Travel

Thank you to all those who provided comments encouraging MassDOT to prioritize the safety of people using bicycle and the connectivity of the bicycle network. MassDOT views safe bicycle travel

as an important priority for the future. In Beyond Mobility specifically, Action Items SAI3.1 (Sidewalk and Bicycle Facility Gaps), SCTAI1.1 (Complete Streets), DCAI2.1 (Funding Program for Multimodal Transit Connections), DCAI2.2 (Shared Use Path Program and MassTrails Grants), all make reference to the importance of advancing safe bicycle travel in the Commonwealth. In addition to continuing our ongoing efforts to advance this goal as described in Beyond Mobility and MassDOT's Bicycle and Pedestrian Plans, MassDOT's Office of Transportation Planning is developing a resource known as the NextGen Bicycle and Pedestrian Vision Map, which will document gaps in the active transportation network as a basis for future investment.

MassDOT acknowledges comments received during the Beyond Mobility public comment period referencing a need to incorporate stronger standards and design criteria when it comes to bicycle safety and the need for more bicycle racks on buses. This feedback has been shared with the appropriate Highway Division and Rail and Transit Division staff at MassDOT for consideration.

Table 3 Comments on Safe Bicycle Travel

Comment Number	Comment
1	I'm really happy that non-car ways of transportation are encouraged. As someone who bikes a lot, my biggest fear is my son being hit while he bikes. More safe biking lanes everywhere please
2	Mobility has to reflect that traditional bikes are in the minority at this point in life and yet have to contend with heavier, faster and larger vehicles, from electric motorized bicycles to full blown motorcycles as well as scooters and onewheels, sharing their traditional space. Add in the fact that the normative behavior of almost all non-car vehicle operators is to completely blow off traffic regulations and that much of the "bike" related infrastructure is poorly designed and badly maintained and it has become terrifying to ride a bicycle in the Greater-Boston area. Before expanding "Mobility," we should understand what this "Mobility" is and why our designs for it and use of those designs is currently so problematic.
3	Bike lanes must be established as isolated lanes, separated from the main road by a curb at the very least. A painted line does nothing to prevent vehicles from straying into bicycle lanes, and does not enforce the idea that bike lanes are for bicyclists, not vehicles. I would point concerned parties to Eugene, OR, where their bicycle infrastructure makes it possible to traverse the entire city as fast as if you were driving...give or take a couple minutes. Along with some bike routes that do not follow the same roads that cars travel on, the routes that do follow main roads all have a rounded curb with reflective plastic posts to effectively isolate the bike lane from automobiles without presenting a significant barrier that would cause damage to people/equipment in either lane should a crossover occur.
4	I would like to see a higher bar for exemptions to multimodal infrastructure along roads not conforming to the Controlling Criteria established on 1/2/2020 by MassDOT, especially along designated bicycle routes. Additionally, I would like to remove special statutory exemptions for higher speed limits than the statutory limits based on road type along any such road without conforming infrastructure until projects are completed to create the required multimodal infrastructure. I think this could be tied into the planned analysis of sidewalk gaps.
5	Need wide bicycle lanes and security from cars and buses. allow bicycle stopping box in front of car lane to give bicycles quick start lead. Eliminate left turn lanes. have north bound bikes turn right to bicycle box in front of west bound lane to go straight at green light and end up going west (avoiding the left turn and high risk). Need clean, dry and secure bicycle parking at stations near entrances. monthly discount fees. Allow bicycles in last train car? or specific car space. more bicycle racks on buses.
6	One major area that needs to be addressed as part of the SAFETY effort is the matter of e-bikes and delivery drivers. Every day in Boston is like a scene out of Mad Max. They go 30 miles an hour, ignoring automobile laws, and abusing the bike lanes, going the wrong way, etc. It is literally a fatality waiting to happen.
7	I have been very happy with recent local developments where bicycle and pedestrian infrastructure have been implemented, and they have increased commerce and enjoyability of

Comment Number	Comment
	where I live. Please continue to prioritize helping local community projects, and empowering them to provide input on and shape the positive changes they want to see rolled out.
8	The 2015 MassDOT Bike Lane Planning and Design Guide recommends the use of floating bus stops but does not acknowledge the challenges this poses to riders who are Blind/low vision who no longer can rely on common techniques for locating the bus stop. Even more concerning is that the Guide supports the use of constrained bus stops. Although the guide supports placing a "Do Not Pass When Bus is Stopped" sign before the first pedestrian crossing a bicyclist approaches, bicycles aren't subjected to the same level of enforcement and regulations as motor vehicles. As a result, some bikers might not be fully aware of all the rules they are expected to follow, and some tend to make rolling stops instead of coming to a complete stop.
9	I commend the focus on active transportation, and the need to fill in gaps in the sidewalk and bicycle networks.
10	Finally, I recommend adding a section of low cost, high impact action items that should be costed, funded, and executed as soon as possible. Examples include - dedicated bicycle travel lane / trail connectivity (leverage existing infrastructure, make it safe by adding lights, crosswalks. I should be able to get anywhere within 30 miles of Fanueil Hall in less than an hour by bicycle, SAFELY.) - automated speeding detection on state owned roadways - sidewalk development in high priority areas.

1.4 Improved Coverage of Transit Network/Transit Investment Needs

Thank you to all those who provided comments encouraging MassDOT to increase investment into transit. MassDOT views transit as critical to people's everyday transportation needs. In Beyond Mobility specifically, Action Items RAI1.2 (Rapid Transit Delays), DCAI2.1 (Funding Program for Multimodal Transit Connections), RAI2.1 (Roadway Investments for Transit Reliability), RAI1.6 (Regional Rail Service), RAI2.3 (Funding Program for Transit Priority Projects), all make reference to the importance of advancing transit investments in the Commonwealth. MassDOT's investments in transit focus on moving towards expansion and a more interconnected network as well as electrification.

MassDOT also acknowledges the funding challenges associated with transit. Within the Beyond Mobility document, under the "Cross-Cutting Theme #2: Financial and Staffing Resources" heading, the following statement reflects this challenge and the need to collaborate with our partner agencies to address it in the future. In the final plan, in response to comments received, a reference to the RTAs has been added to this paragraph, as well. "During the development of Beyond Mobility, MassDOT staff have reported particularly insufficient Federal and State funding for rail and transit needs, which leads to funding shortfalls in areas required to maintain a consistent level of service on passenger and freight railways in the state. For example, the MBTA is under pressure to deliver new projects even as it struggles to maintain the system in a state of good repair, which would better facilitate reliability. It has therefore become important to document project types that enhance both operational efficiency and reliability. Massachusetts' RTAs face similar financial challenges, as well."

With respect to location-specific transit expansion projects, please note that rather than providing a list of unfunded projects, the Beyond Mobility plan articulates meaningful action steps that can be taken to move the needle on advancing key priorities, including transit expansion. Future Capital

Investment Plans (CIPs) for both MassDOT and the MBTA will provide more detail on specific investments made in this area.

With respect to web-based resources that speak to needs related to improved travel experience and available transportation options, please visit: https://massridematch.org/. Additionally, please see Action Item 3.4 "Regional Mobility Manager Network."

Table 4 Comments on Improved Coverage of Transit Network/Transit Investment Needs

Comment Number	Comment
1	"This leads to funding shortfalls in areas required to maintain a consistent level of service on passenger and freight railways in the state." Yes this is true, so explicitly commit to funding railways better. You already spend far more on highways. Align your budget priorities with your stated goals. The state will not meet its climate goals (which coincide with the end of this plan if you do not change this dynamic fundamentally. Flex funds all the time. Invert the 80-20 ratio. See what happens when you adequately fund transit.
2	The "Supporting Clean Transportation section" Needs to have a commitment not only to electrifying public transit but also to expanding it. What about critical public transit infrastructure gaps? Why do those go unmentioned?
3	There is only a single mention of VMT (Vehicle Miles Traveled) in the Executive Summary document, and it appears in an item devoted to studying the impact of congestion pricing. The goal of Reducing VMT naturally leads to plans to expand transit infrastructure, expand cycling and walking infrastructure, and supporting widespread land-use and zoning changes to enable people to live closer to the amenities that make day to day living possible.
4	"MassDOT believes that fully achieving decarbonization goals must involve a multi-pronged strategy that goes beyond electrification to emphasize the importance of moving more people with fewer vehicles." Again this is great but actually demonstrate this. Even in this document you explicitly address expanding electric car supporting infrastructure but you do not explicitly call for public transit expansion. That is backwards if you actually believe this.
5	In the "Destination Connectivity" section again you should explicitly call for expanding public transit. It is great to invest in Microtransit "in communities served by Regional Transit Authorities (RTAs) that may not have and/or lack the density to support fixed-route service." but you should also invest in fixed-route transit in the places that do have that density. Develop a BRT-LRT-HRT plan for the whole commonwealth, especially looking at the gateway cities, and disadvantaged neighborhoods in the inner urban core of Boston. If you truly believe "MassDOT believes that the primary purpose of the transportation system is to connect people to the places that they need and want to go." You need to expand public transit to do that. It doesn't currently meet that standard in many places.
6	"MassDOT is committed to the principle that a “regional rail” system with expanded service throughout the day is critical to building a stronger and more inclusive state economy." This is also great. I hope you are looking at best practices around the world (German SBahns, Paris RER, London's Overground, even Philly's Regional Rail). Many of these systems have involved one or more central tunnels to connect legacy disconnected suburban networks. I hope you recognize the lesson this tells for NSRL. I also wonder, Is this including the whole commonwealth? Does it include the Cape? Does it include the Pioneer Valley? Does it include Northern Tier? Does it include the Berkshires? It should.
7	The vision for "travel experience" mentions "transportation network will be expanded throughout the Commonwealth" but the values do not mention target transit expansions for underserved areas to encourage mode shift only improving the "travel experience" which is very vague. In general though the Commonwealth cannot afford to simply maintain overall system quality, it must actively improve it.
8	In the problem statement "Though the Commonwealth supports reduced vehicle travel as a climate change strategy, people traveling in Massachusetts find it difficult to get around using

Comment Number	Comment
	other modes including transit, bicycling, and water transportation." Add a commitment to expand transit, bicycling, and water transportation.
9	Create a public inter-city bus service across the commonwealth servicing every corner from Provincetown to Williamstown, Rockport to Great Barrington. Filling gaps created by the separate RTAs and MBTA Boston oriented service. Private passenger busses have atrophied since covid and they served a crucial transportation role for a lot of working class people. These routes should be brought into public ownership and expanded upon to preserve and grow these connections. NJ Transit is a decent model to look to, although frequencies on many routes could be better.
10	One of the most important segments of rail not owned/controlled by MassDOT is the Attleboro Secondary (ATS), between Taunton and Attleboro. One failure of South Coast Rail has been focusing on rail transportation between South Coast communities and Boston, while ignoring an equal or greater need for transportation between Providence RI while also bypassing Taunton (East Taunton is no better than going to Mansfield or Attleboro). Utilizing the ATS would allow: Rail service connecting Taunton, SC communities, and other communities (Cape, Buzzards Bay, Middleboro, etc) with PVD, Amtrak, TF Green Airport and more. Direct Amtrak service between NYC and the Cape (seasonal or year round), and connections at PVD to/from SC Communities via MBTA service. Increased service on SCR/Middleboro line during peak hours bypassing choke point, by routing returning (less demand) via Foxboro and ATS.
11	I am concerned at the lack of straightforward statements that regional transit authorities like PVTA, MBTA, and GATRA need more funding to do what they do. Electrification and frequency are clearly two very important topics to meeting climate goals and increasing ridership and I am assuming they will be expensive.
12	This also means that our public transit system should be more extensive than just in large cities. Shared transportation would help decrease CO2 and methane in the air. This shared transportation should be citizen owned not corporate owned!! (The corporate owned electric system has leaky transmission lines and is in bed with other corporations that supply Artificial Intelligence.) All this implies more mining and more climate change gasses expelled!
13	I have lived in various communities outside of the T's service area, and have worked in Kendall Sq. For 5 years. I have never lived in an area where public transit would be the easier / cheaper / faster option, with the exception of 3+ hour commutes to and from Lowell. While I could provide detailed feedback on the measurements of success, I'll stick to 2 major points: the measurements should be defined against the ideal scenarios, such as zero transit based emissions, zero transit deaths, minimized average commute times across public and private transit, etc. In addition, the plan should detail the accountability steps - who is responsible for securing funding? Who should the citizens of the Commonwealth of Massachusetts look to when no specific transit goals are defined or achieved?
14	Connectivity: Develop an extensive, integrated rail and bus network to enable statewide connectivity, enhance walkability to transit, and expand bike infrastructure.
15	Destination Connectivity Action Item DCAI3.1 predicates expanding local/regional funding opportunities based on increases in federal funding. State funding should also be made available for destination connectivity purposes.
16	I was expecting to see a discussion of web-based resources and apps in addressing Travel Experience and Destination Connectivity Problems. Could MA DOT or some other entity develop one platform that could be used by all in the Commonwealth?
17	Destination connectivity is another action item that heavily influenced the creation of our vision and priority statements. The Partnership has been a staunch advocate for increasing the interconnectivity of our region's transportation system. The Partnership supports innovative and pragmatic approaches to improving public transit accessibility and connectivity across the Commonwealth to further induce ridership. The Partnership has committed to work with stakeholders to explore location-specific strategies and opportunities to improve connectivity and accessibility, including the interspersion of small-scale park and ride lots throughout connecting communities on interlocal routes. Seamless travel also includes supporting strategies to ensure the rider's experience is both affordable (especially when compared with the cost of travel via private vehicle) and minimally cumbersome.
18	Develop an extensive rail and bus network to enable statewide connectivity, enhance walkability to transit, and expand bike infrastructure.

Comment Number	Comment
19	Page 111, Problem Statement 3 Action Items fail to reflect problem statement detailed needs (page 79), including "a lack of ongoing and sustained funding" for "pilots of microtransit and fixed route service in rural and suburban areas [which] provide important access to critical destinations." On page 87, a Values statement includes, "MassDOT is committed to supporting robust on-demand transit services using dedicated drivers and vehicles across the Commonwealth, especially in communities served by Regional Transit Authorities (RTAs) that may not have and/or lack the density to support fixed route service." The values statement overshoots and overly limits the method by which a reasonable goal could be achieved, while the Action Items undershoot what would be needed to reach a reasonable goal. Consider MassDOT's responsibility to ensure sustained access to critical destinations for rural and suburban populations who cannot drive. MassDOT should investigate pathways and ensure fiscal sustainability for lifeline services for rural and suburban non-drivers including low-income and disabled residents.

1.5 Roadway Capacity

Thank you to all those who provided comments emphasizing that roadway expansion is detrimental to a sustainable and connected transportation network. Per our value statement listed under the Reliability Priority Area, Beyond Mobility makes clear that "MassDOT does not believe in roadway expansion as a means to reduce congestion." Values like this will be referenced when decision points arise surrounding project design to ensure that all future projects undertaken and overseen by MassDOT adhere to the Beyond Mobility values statements and broader plan.

Table 5 Comments on Reduced Roadway Capacity

Comment Number	Comment
1	"MassDOT does not believe in roadway expansion as a means to reduce congestion" Again this is wonderful (finally), but demonstrate this in your projects. The plans for route 2 are a highway expansion. You plan highway expansions for both Cape bridges. Stop doing that if you claim you don't believe in that. I would encourage you to go even further here and explicitly commit to shrinking roadway space and using it for active travel and public transit, expanding public spaces, and adding green infrastructure.
2	In the action areas for safety I would encourage you to develop a plan for low traffic neighborhoods, which are proven to dramatically improve safety for all road users and especially pedestrians and bicyclists, across the commonwealth.
3	"MassDOT is committed to prioritizing reduced car travel" This is fantastic but demonstrate that in your projects. Shrink roadway capacity and expand walking, biking, and transit options. Start at the throat in the Allston project. Shrink 90 into 3 lanes, which it has operated with due to construction for years with a little further down little discernible difference, and shrink Storrow/SFR to one lane in each direction. Use the freed up space for park lands and storm water retention and/or public transit expansion.
4	This plan looks great you guys have all the right ideas. The only problem is it is too little too late. We need to change faster the climate crisis is here now, and children are being mowed down by f-150s now. 2050 is too late. We need radical change and we need it now. We need to do everything possible to reduce private vehicle usage and reclaim the space lost to cars.
5	"Massachusetts traffic fatalities and fatality rates have risen since 2019, despite lower vehicle miles travelled." This is because capacity has not reduced comparatively. Many roads that were slowed by congestion, making them safer in fact, were much more free flowing during the pandemic and so people were able to drive much faster on roadways that encouraged vehicle flow not safe speeds. You need to recognize that your goal of reducing congestion is at odds with your

Comment Number	Comment
	goals around keeping pedestrians and bicyclists safe. Not only should it be more inconvenient to drive, to encourage mode shift to more sustainable and healthy options, making driving slower also keeps everyone else safe. You should specifically study the relationship between congestion level and road safety particularly with a focus on speed in crashes that kill and injure vulnerable road users. Stop prioritizing congestion reduction for private vehicles. Reduce the impacts of congestion imposed by private vehicles on public transit instead. If that means making private vehicles more congested, good. That will only incentivize using the traffic free transit options more, and improve road safety for pedestrians etc.
6	Thank you for putting together this presentation. Something of note is transportation systems are tied deeply to other aspects of our society - and improving transportation will have to reach outside of its bubble. For example, transportation is most cost effective when it can serve many people in a small area ("hubs"). Parking mandates and exclusionary zoning prevent this kind of gathering, making transportation less effective. I'd like to see more *emphasis* on *deemphasizing* the car - by re-configuring roadways, installing pedestrian safety measures, and more we enable people to choose other modes of transportation which are cleaner, cheaper, and more equitable than the car. For example, we should never again need to widen a highway. Those billions of dollars can be spent much more effectively as described here and in other comments you've received. Thank you for your consideration.
7	Another concern of mine is the constant highway and road expansion - even just recently, the DOT announced a highway expansion project near my workplace. We don't need more lanes - we need more train tracks, bike lanes, and thriving local communities so people have the things they want nearby!
8	We must go on a road diet, removing unneeded capacity from our highway network
9	MassDOT should commit halting road expansion. They should prioritize electrified commuter rail and build the NSRL.

1.6 Resiliency Impacts on Infrastructure

Thank you to all those who provided comments emphasizing the urgency of implementing climate adaptation and resiliency changes. MassDOT views resiliency as central to a system that withstands the effects of climate change and critical to the preservation of existing assets. In Beyond Mobility specifically, Action Items RSAI1.1 (High Risk Asset Identification), RSAI1.5 (Resiliency Grant Program), RAI1.9 (Climate Change Adaptation and Guidance), RSAI1.4 (Comprehensive Culvert and Drainage Inventory Mapping), all make reference to the importance of resiliency policy and program changes to mitigate climate risks in the Commonwealth. MassDOT's Resiliency Improvement Plan (RIP) currently under development lays out a framework that accounts for both future infrastructure's impact on resiliency and the impacts of current infrastructure.

Table 6 Comments on Resiliency Impacts on Infrastructure

Comment Number	Comment
1	In the "Resiliency" section you should add to the vision the idea of minimizing the contribution of our transportation to environmental and climate impacts (urban heat island effect, stormwater runoff, air quality issues, and even climate change in general). Our transportation infrastructure isn't simply vulnerable to these issues, in many ways it actively worsens them. You should not only look to make current and future infrastructure resilient to environmental impacts you should look to reduce the impact that that infrastructure has on the environment. This would align well with a goal to reduce roadway size.
2	In the Resiliency section I would again urge you to add action items about using transformational infrastructure investments to mitigate environmental hazards not limit yourselves to protecting existing infrastructure from them.
3	Ensure the climate resilience of critical infrastructure and plan for alternative routes.
4	Drains don't work. 253 n.end boulevard
5	A concern of mine is regarding the climate change adaptability and future-proofing of infrastructure. In particular, low-lying depots such as Salem need work started soon in order to avoid regular flooding according to current predictions of sea level rise over the next several decades.
6	The Resiliency section is well done. Regarding action item RSAI1.11, it is not clear if the Highway Resiliency Improvement Plan includes a section on rapid response to be able to respond to climate change (severe weather) events when transportation infrastructure is damaged. It is imperative that such a plan/section exists to be able to respond immediately with an emergency repair. Similarly, action item RSAI1.12 should be expanded, and a similar program with standards be adopted for the entire transportation system. Furthermore, RSA1.14, Resilient design research and planning efforts should be accelerated. Impacts of climate change have already begun and all regions of the Commonwealth have experienced severe impacts to their transportation infrastructure.
7	Please note that the resiliency concerns listed on P.95 are only a small subset of the actual needs. It would be interesting to see who provided the information on the survey. Since rural communities have limited staffing, I suspect they are probably very much underrepresented in survey responses. Including the Figure 4.7 map in a report may cause people to assume there are no resilience problems in North Central MA and other rural areas. Could the final report include some of the MVP data instead?
8	MassDOT should fully develop and fund plans to make all critical transportation infrastructure climate-resilient. One key goal is to outline alternative routes and prepare infrastructure that will allow for continued service in case of disruption. Increasingly hot summers expand and buckle train tracks. Record snowfalls lead to the MBTA failing to operate vehicles necessary to maintain daily service. Worsening floods submerge parts of the transit system, leaving people stranded without a way home. In September 2023, Leominster suffered nearly a foot of rainfall in four hours, decimating infrastructure, including the Commuter Rail tracks. “Climate resilience is no small concern – it’s a safety, economic, and social justice issue.” And when the transit system fails to withstand the worsening elements, people turn to their cars–if they have the privilege of transportation options–which adds to vehicle emissions and moves us further from our climate goals.
9	Ensure the climate resilience of critical infrastructure and plan for alternative routes.

1.7 Congestion Pricing and Tolling

Thank you to all those who provided comments regarding tolls and increased revenue to fund the transportation system. In Beyond Mobility, Action Items RSAI1.5 (Roadway Pricing Study) and RAI2.3 (Funding Program for Transit Priority Projects) make reference to the innovative ways to increase revenues to fund transit capacity in the Commonwealth. This issue will be further explored

in the future as part of ongoing discussions regarding transportation financing. Concerns surrounding any future policies' impacts on rural, low-income, and other impacted communities will be thoroughly addressed as part of any future work on this topic.

Table 7 Comments on Congestion Pricing and Tolling

Comment Number	Comment
1	In the reliability section: Please also study the use of VMT to fund the transit capacity needed for success, as has been done in London. This is a revenue stream, the lack of transit capacity is a revenue issue. Use that revenue to address that issue.
2	To pay for road infrastructure the state should adopt a toll system equal to New Hampshire. With a push towards carbon free transportation the states ability to raise taxes from the fuel tax will be reduced year over year, tolls will fill the gap. The toll fee can be set very low compared to other states if strategically placed to raise the most funds possible. Locations such as 93/95 interchange and similar high volume areas, border locations, and into major population areas. By setting the fee low say .10 cents drivers will be less inclined to complain. The fee can be raised over time to maintain the infrastructure as more shift to other forms of transportation.
3	Please remember that roadway pricing without viable and affordable other mobility options is a regressive way of approaching the situation. RAI 1.5 (Roadway pricing study) must carefully consider the impacts to all affected, including those traveling from rural areas and other places without other mobility options.
4	On page 145, a discussion on the impact of VMT as it relates to gas tax and toll revenue is presented. This discussion fails to mention several disparities which rural areas face. As rural areas are more sparsely developed, residents must travel further to reach their destinations, increasing their VMT. Rural areas also have very limited transit options, in comparison to urban areas. This disparity requires the use of personal vehicles, which increases VMT. Instituting a VMT fee/tax would adversely impact rural area residents who do not have access to robust transit systems in urbanized areas.

1.8 Free/Reduced Fares

Thank you to all those who provided comments regarding reduced fares and a fare free system. MassDOT views reducing costs for transit riders as critical to advancing equity and increasing the use of public transit. In Beyond Mobility specifically, Action Items TEAI1.1 (Fare Program Results) and TEAI1.2 (Fare-free transit options), all make reference to the innovative ways to implement fare policy to make transit more affordable in the Commonwealth. MassDOT's commitment to equity is made evident as we strive to ensure transit is financially accessible for all those who use the network. In response to comments provided during the Beyond Mobility comment period, the final plan has been updated to reflect additional future performance measures focused on all transit riders (not just MBTA riders) that are low-income. The analyses done on the percentage of just MBTA riders who are low-income was performed as part of the plan due to data availability, but reference to expanding this analysis to cover all RTAs has been added and is a priority for future work.

Table 8 Comments on Free-Reduced Fares

Comment Number	Comment
1	In the "Travel Experience" section take out "Explore" and simply expand access to the MBTA's Free/Reduced Fare Program for eligible riders with disabilities, older adults, young people, and low income individuals. I am a recipient of Somerville's free Carlie card program for low income people and it has been massively beneficial to me. So many people would benefit from expanding this to all eligible people.
2	Rather than "Coordinate with Massachusetts' RTAs to continue piloting" free fares, simply make all public busses in the commonwealth free. MBTA and RTA. The positive impacts in terms of ridership, boarding speed, safety, and personal finances for those who need it most are clear and obvious. Commit to giving this the funding it needs.
3	I would like to be able to get on demand transportation that I can afford. Right now I have no transportation to see my friends, go out to eat, to events, and lots more.
4	The Travel Experience performance metric on page 136 – "Measuring Over Time: Percentage of MBTA Riders who are Low Income" is too focused on the MBTA. MassDOT should consider adding additional content in this section on how they aspire to develop this performance metric for the entire Commonwealth to assess low-income transit riders for all regional transit authorities, not just the MBTA. It should also be expanded to assess equity for passenger rail service in the Commonwealth.

1.9 Urban Environmental Justice Transit Service

Thank you to all those who provided comments regarding not overlooking the burdens Environmental Justice (EJ) communities face with the transportation network. MassDOT recognizes the inequities in terms of connectivity for EJ communities who experience a disproportionate number of barriers to opportunities. In Beyond Mobility specifically, Action Items DCAI1.1 (Commute Time Disparities), DCAI1.2 (Tracker Metrics for Destination Connectivity), DCAI1.3 (Options for People who are Low Income or who have Disabilities), all make reference to the challenges and policy levers to better connect EJ communities to critical destinations in the Commonwealth. MassDOT strives to invest in the needs of EJ communities from a state and federal perspective. The MBTA's Better Bus Project (https://www.mbta.com/projects/better-bus-project) describes other ongoing efforts that address comments related to bus network connectivity, including MBTA's Bus Network Redesign.

Table 9 Comments on Urban EJ Transit Service

Comment Number	Comment
1	In problem statement "Residents outside of inner core areas across the Commonwealth, particularly those in rural areas, lack convenient transit services and other non-vehicular transportation options and feel disconnected from cultural, economic, and other opportunities." Please also recognize that many residents inside of inner urban core areas also lack convenient transit services and other non-vehicular transportation options and feel disconnected from cultural, economic, and other opportunities. This is particularly pronounced in minority communities. Not recognizing or planning to address this issue is a major oversight with profound implications on equity.
2	"There is a lack of network connectivity in rural areas, particularly related to public transportation including Commuter Rail, trains, and buses. Currently, there is insufficient connectivity and coverage in much of western and coastal Massachusetts. Users describe a fragmented system that prioritizes urban areas like Boston while leaving rural and suburban areas out of the picture."

Comment Number	Comment
	There is also a lack of network connectivity in Boston particularly in Roxbury, Mattapan, Hyde Park, and the South end. The state has never lived up to its promise of "equal or better" service after removing the Orange Line from Roxbury. Chelsea, Everett, and Lynn are all also urban communities with disproportionate minority populations lacking meaningful network connectivity. This seems to take for granted that the network is well connected in the inner core and it simply isn't. Many urban areas, which actually have densities to support transit already, have been left out of the picture as well.
3	In the "Destination Connectivity" section problem statement "People living in Environmental Justice communities are burdened by connectivity inequities across our transportation system, limiting their access to opportunities." Add a commitment to expand public transit in Environmental Justice communities.
4	Surprise! There are a few areas in the city of Boston which are very isolated! Charlestown is one! If you don't have a car it can be almost impossible to venture beyond our community space. You see, every means in and out is over a bridge (we are a functional island) to add to that about 40% of the Cities core traffic passes through us in some form over us, on our street space and even under us! So we need more connectivity! And no not cars and not buses over our most congested streets fighting for access from all of the other regional traffic! We have an innovative means using an old rail line to get us to the Orange Line transit system which is just out of reach for most of us! Along the North side of the hills and along the harbor and river. We need a first/last transit solution to get us to our Orange Line stations and then onwards to the Green Line stations near us. But we also need walkable and cycle access across our bridges not only for us but for those who want to bike into the city and Cambridge through a enhanced Gilmore bridge crossing by adding a parallel cycle/small shuttle bus to get to Cambridge and Lechmere T station as well as for us to find the nearest sizable green space to us in Medford MacDonald Park! Venturing up the river to Draw Seven Park.
5	Please Extend Bus 119 Route to Point of Pines FULL SCHEDULE from the NEW FIRE STATION along Revere Beach Blvd. & Ocan Ave to Beachmont Station to Northgate Shopping center. This will SERVE MORE RESIDENTS with BETTER SERVICE than they have now! A way for people to get to and from work. A way to REDUCE the number of cars on streets. A way for people to go to pharmacies, churches, restaurants, shopping malls, stores downtown. THIS WILL GIVE ACCESS TO MORE PEOPLE TO TWO SHOPPING MALLS. People looking to rent or buy need convenient bus service. There is MUCH NEW HOUSING along this extension. MORE people would interested IF THERE IS REGULAR, CONVENIENT BUS SERVICE. Many people have written the mayor of Revere to ask for this. 'EVERY PERSON ON A BUS REPRESENTS ONE LESS CAR ON THE ROAD'
6	Surprise! Most will be trekking through Charlestown! So any event at the stadium will shut us down! Can't get out and can't get in! This won't do! And NO!! Altering Rutherford Ave is not a solution. The 2019 design we worked so hard on is what we need or do nothing!! I can live with the pain I know not what you will create onto us with any other solution. The correct answer is to create what Everett has asked for in the past, opening up a Orange line spur into them. They only need two stations one for the stadium and end point for the Silver Line and one more up a piece near Revere Beach Parkway to serve the needs of the rehab of the Exxon fuel farm area no matter what it developed within it and offer the staging space for the Orange line carriages to wait for the exiting stadium crowd. This is a better plan than the Silver line to Sullivan Sq. Building a new bridge next to the commuter rails and adding into it the multi-use bridge element into Draw Seven park. BTW - This is a threefer! As you also open up the third rail landings in both Sullivan and BHCC stations so we have for our expansion goals as laid out in PLAN: Charlestown the needed support. Oh, what's the third? A bigger tax base with all of this new development! But! You need to break the eggs to get the reward of the omelet!

1.10 Updated Active Transportation-Oriented Design Standards

Thank you to all those who provided comments on following the most up to date active transportation guidelines and standards for our multimodal transportation system. MassDOT's internal design expertise is continuously updated using external guidance on design and construction for bicycle, pedestrian, and transit infrastructure. In Beyond Mobility specifically, Action Items SCTAI1.1 (Complete Streets), DCAI2.1 (Funding Program for Multimodal Transit Connections), DCAI2.2 (Shared Use Path Program and MassTrails Grant), RAI1.9 (Expand Roadway Asset Management Activities), and TEAI4.2 (Inventory of Active Transportation Amenities) all make reference to making use of the latest policy, funding, and construction mechanisms to improve on a multimodal system that is connected and prioritizes all users in the Commonwealth. MassDOT Highway Division's Engineering Directives, Design Justification Workbook (DJW) process, and design guidelines require project proponents to include bicycle, pedestrian, and transit infrastructure as part of all projects MassDOT oversees, ensuring that infrastructure is as safe and connected as possible for all users of the transportation system. Waivers are only granted in extenuating circumstances.

Table 10 Comments on Updated Active Transportation-Oriented Design Standards

Comment Number	Comment
1	A commendable statement of goals. Now to adopt standards that ensure they are put into place. Changing roadway design standards to require certain levels of pedestrian, cycling, or transit accommodations on any road meeting given criteria, as under the City of Cambridge's Cycling Safety Ordinance (or perhaps more notably the CROW manual in the Netherlands), can help cut through red tape when implementing such improvements.
2	The goal of Reducing VMT naturally leads to plans to expand transit infrastructure, expand cycling and walking infrastructure, and supporting widespread land-use and zoning changes to enable people to live closer to the amenities that make day to day living possible.
3	The creation of separated biking infrastructure is vital for providing people safe ways of getting around their areas. Local municipalities fight these items tooth and nail, and the mechanisms for feedback to localities often exclude those who don't or can't use a car (IE town meetings during working hours on weekdays). State level mandates and design requirements make these local political groups very angry, but are the most effective way to get infrastructure built. At one meeting we attended, a town official put forward a motion to remove the possibility of adding a bike lane on a dangerous street. He removed the motion when he was informed this would result in a loss of state funding for that road due to non compliance. The executive summary indicated many admirable and lofty goals, with a specific emphasis on reducing car dependency and meeting our climate goals, which was great to see. Please ensure there are specific methods to force local politicians to implement standards of infrastructure for more than just cars. The use of standards and mandates for compliance, while leaving the option of how to accomplish those goals and implement those standards to individual towns, will give the towns some say over how a project is done without letting them end/stall the project.
4	The Travel Experience performance metric on page 136 – "Measuring Over Time: Percentage of MBTA Riders who are Low Income" is too focused on the MBTA. MassDOT should consider adding additional content in this section on how they aspire to develop this performance metric for the entire Commonwealth to assess low-income transit riders for all regional transit authorities, not just the MBTA. It should also be expanded to assess equity for passenger rail service in the Commonwealth.

1.11 Expanded Passenger Rail

Thank you to all those who provided comments on expanding the passenger rail network. MassDOT's Compass Rail initiative calls for expanding the passenger rail network in Massachusetts to expand transportation options, support economic development, improve the freight network, and shift car trips to greener modes. In Beyond Mobility specifically, Action Items DCAI1.1 (Commute Time Disparities), RAI1.6 (Regional Rail Services), and DCAI3.3 (Compass Rail), all make reference to the expansion of the rail network that increases reliability and accessibility for all users in the Commonwealth. MassDOT's focus on the importance of access to critical destinations emphasizes passenger rail as a central mode of transportation to get people around safely.

In response to comments received during the Beyond Mobility public comment period on the topic of passenger rail, the final plan has been updated to add the following language to the third Destination Connectivity problem statement: "Current passenger rail service opportunities for the western half of the Commonwealth are extremely limited" and additional detail has been added regarding the status of the Compass Rail initiative in Chapter 5 (Action Items) in the “Ongoing Destination Connectivity Efforts” section. Additionally, Action Item DCAI3.3 Compass Rail, has been updated to note that as the Compass Rail initiative advances, MassDOT will provide a defined mission statement, key milestones, and detailed project schedules as projects obtain funding.”

Table 11 Comments on Expanded Passenger Rail

Comment Number	Comment
1	Hello there! Thank you so much for all of the hard work you do. However, I would have loved to see the Northern Tier Rail form a part of the Statewide Long Range Transportation Plan. I believe it is an integral part of transportation infrastructure the state must make, which will improve transportation for hundreds of thousands of residents. Is there any way for it to just be added? Moreover, it would be wonderful to see more references to rail in general! As we as a society must pivot away from carbon-centric infrastructure (such as highways), the state should greatly seek to invest in rail travel.
2	I would love to see some planning studies on rail transportation (either commuter rail, subway, light rail, etc) corridors that do not just connect people to or from downtown Boston. Existing freight and historic ROW connect many gateway cities, especially in the Merrimack Valley. New passenger rail service could be transformative to these communities.
3	goodmorning, I live in Western Ma. Turners falls, and voices from the entire state are important in your beyond mobility plans. accessible routes, ada sidewalks, accessible vans, Amtrack(next towns) and few buses traverse here. MOre to be done for accessible boarding for local bus service, shelters,, accessible buses. and realize we need help for sidewalks, as seniors do not use bikes. accessible boarding for amtrak in Greenfield, Ma. sidewalks on bridges, crosswalks, .. thanks you for your response, betty tegel/ advocate
4	I am impressed with the work that has gone into this plan, the future model scenarios and the effort to get resident input. I am a bike commuter in Springfield and travel to Boston a few times/ month for work. The streets are filled with broken glass and I play chicken with cars, busses and trucks to get to work on my bike. When I go to Boston, I wish I could easily take a train from the recently renovated station in Springfield. I FULLY support moving infrastructure away from cars and towards biking, walking and rail.
5	Western Mass needs both light rail and high speed trains. Light rail for relatively local areas, maybe only just the a tri-county area. But W Mass residents need high speed access to at least Boston and New York City. People could live here in Western MA where it's relatively affordable and work and also just visit and enjoy other areas without 3 hour car rides.

Comment Number	Comment
6	more connectivity across the state with electric rail
7	That is indeed quite a collection of documents and I will slowly digest it over time. My main interest/concern other than the the disgraceful level of disrepair many road and street have fallen into in Berkshire County, mostly in Pittsfield and Adams, but in other locations as well, is intercity (West/East and North/South) passenger/regional rail. And you spent some time in your NEPR interview on the latter. What bothered me when you ran down the list of existing train services, which remember was supposed to illustrate routes we who live here can ride, was your inclusion in that listing the Berkshire Flyer. Is it your feeling that residents of Berkshire County can, as a practical matter, use that service? Do you think that service actually adds to our travel options in that Berkshires to New York City travel market? I sure hope not. I will only add on proposed development of intra-state and interstate passenger rail, I am very skeptical that it will ever expand enough to make a significant difference in how folks in this state chose to travel. With the possible exception of restoration of the Inland Route in concert with CT, where the “heavy lifting” will be borne by CSX, Amtrak, and ConnDOT, I do not believe MassDOT has the appetite to engage in any other route expansions.
8	The 2024 Update to the Regional Transportation Plan (RTP) for the Pioneer Valley Metropolitan Planning Organization includes the following problem statement: “Existing passenger rail and transit service does not meet the needs of residents of the Pioneer Valley. Expanded passenger rail and transit connectivity, particularly to eastern Massachusetts, is integral to education, economic development, and workforce development.” There is a strong desire to expand passenger rail service in the Pioneer Valley region. Results from the RTP Public Outreach survey show that over 50% of respondents would ride the train monthly if the frequency of rail service was increased between the Pioneer Valley and Boston. While the Vision and Values statements for the Destination Connectivity priority area somewhat reflect the need for improved passenger rail options, this is not accurately addressed in the Problem Statements on page 77. This could be best addressed by adding the sentence “Current passenger rail service opportunities for the western half of the Commonwealth are extremely limited.” To the end of the third problem statement on page 77.
9	- Please consider Old Colony Main Line Bottlenecks by implementing double tracking along Old Colony Main Line. Funding is included in the Proposed FY 2025-2029 MBTA CIP to initiate some planning work on the significant bottlenecks existing on the Old Colony Main Line in Braintree, Quincy, and Boston. This funding nests under line item Rail Modernization Early Actions - Old Colony Double Track (P1209). - With the pending implementation of South Coast Rail Phase 1, the MBTA should work to minimize service disruptions and maintain levels of service on Old Colony Middleborough/ Lakeville Line stations as once revenue service begins. - As the Commonwealth moves towards a greener and more sustainable future, the MBTA should continue demonstrating its commitment to Regional Rail, building on the efforts in this CIP. Investing in regional rail infrastructure is becoming increasingly urgent. The Old Colony Lines can provide frequent, affordable connections from the communities of Southeastern Massachusetts to the metropolitan Boston job market and to each other. Regional Rail would further provide an alternative to the congestion on the Southeast Expressway.
10	Passenger rail is specifically addressed in Action Items RAI 1.6 and DCAI 3.3. Both Action Items would be strengthened by a commitment to specific implementation milestones to achieve expanded rail service. It is recommended that the last sentence of Action Item RAI 1.6 “Similarly, RTD will continue efforts to develop Compass Rail.” be modified and included as its own individual action item. We recommend “Continue efforts to expand Compass Rail with a defined Mission Statement, key milestones, and implementation schedule.” Ideally, this would have a “Short Term” timeframe.
11	please make sure that the western Mass communter or Amtrak rail service is electric trains only. we need to make the investment in order to decarbonize transportation. especially new service routes should be electric from the get go even if electrification costs more. better spent now than adding to future costs. don't kick the can down the road. we need to decarbonize all transportation ASAP. we can do

Comment Number	Comment
	this. and have bicycle racks on the train for traveling in to and out of stations by bicycle feasible. have bicycle parking containers lockable for bike commuting as well. add solar PV canopies where possible over parking lots to generated 100% renewable energy and contribute to Gov's goal of 10GW by 2030. thank you
12	I am happy that others have provided input about improving rail service in Massachusetts. I want to echo the calls for increasing rail and bus service frequency and expanding rail service throughout the state. Looking to my home state of CT as an example, reliable rail is achievable and can provide good quality service not to just to major cities like New York but also throughout the state such as the CT rail project that brought service to the Hartford Line. Here in Massachusetts we have an opportunity to do the same through projects like the Compass Rail project, the Northern Tier proposal, and working to fix the subway in Boston. Building bigger roads and adding lanes to highways is only a bandaid for traffic problems and it doesn't help low income families or help the state meets its climate change goals.
13	Rail travel, particularly electric trains, need to play a larger part in the Beyond Mobility plan. In particular, our state needs more investment in rail projects which can serve destinations other than Boston. The long term goals of Compass Rail, with several trips on the inland route between Boston, Springfield and New Haven are admirable, but I feel the timeline is too long. We already have a decent station in Springfield, so why is the state not putting in more money now to increase track capacity so we can send trains there to actually use it? I acknowledge that negotiations with CSX will continue to be required to minimize conflicts with freight, but more concrete steps in the short term would be nice. I also would like to see service between Lowell and Providence via Worcester like that proposed by the Boston Surface Railroad get studied as part of Beyond Mobility. If a private company thought they could make money on such a service, then surely the MBTA could do a decent job supplying it. I imagine it would be infeasible to provide high frequency via the existing rail network on such a route, but it could still do something to help take cars off the road during rush hours. Finally, the state needs to get serious about overhead electrification of the existing MBTA commuter rail system. Battery electric is fine for busses and cars, but simply cannot support the demands of rail travel. Overhead electrification is more expensive up front, but investment now would bring operational savings later, to say nothing of the health and climate benefits.
14	I wish this plan had more talk about the commuter rail specifically. Trains need to run more frequently to convince more people to take the commuter rail instead of driving to Boston. I work my entire schedule around when the commuter rail runs but that only works because I don't have kids. My coworkers can't do that because the infrequent, overcrowded, and sometimes late trains don't work with school pickup and daycare schedules. There isn't enough flexibility. The other issue is within Boston. North Station has no easy connection to the red line and I have missed many evening trains due to an unreliable red line. The poor ted line service has led many of my colleagues to insist they have no choice but to drive. The problem with that? The shuttle bus from North Station to Cambridge is useless for 10 months of the year because the traffic from all the people who insist on driving, means that passengers can walk faster than the bus can move. Please make the commuter rail and T more reliable. Make it hurt to drive, do congestion pricing in Boston and then our buses can actually function.
15	I am writing to express my concerns regarding the Beyond Mobility plan and to provide feedback on how MassDOT can improve it to better address the needs of all Massachusetts residents. While I appreciate the effort put into identifying immediate action items in the plan, it lacks a bold and visionary approach that is needed for the future of transportation in our state. First, there needs to be more emphasis on transforming the Commuter Rail into an electric one that serves the whole Eastern region (and beyond). To meet the diverse needs of our communities, it is critical to prioritize a robust, clean public transit network that integrates electric long-distance rail, regional rail, and bus stretching across the state.
16	Expand rail to Western mass. To Pittsfield or Albany. Must be electric trains to reduce pollution and greenhouse gas emissions. Need consistent service into Boston North station. and transfer to other lines.

Comment Number	Comment
	best for express train into North station early morning and return evening.
17	I live in Salem MA near the Commuter Rail station, and my workplace is in Woburn, also near a Commuter Rail station. While I would love to take the train, the added commute time compared to driving makes this an unacceptable option for me. I strongly favor a rapid, large-scale expansion of all forms of rail infrastructure, including freight. In particular, connectivity projects such as north-south rail link, red-blue connector, and a ring line to connect various commuter rail stations should be prioritized as they represent relatively low hanging fruit for large-scale projects with longstanding plans. Break ground today!
18	Numerous comments and suggestions have been submitted to MassDOT over recent years that offered ideas for transformational improvements to the transportation infrastructure in Mass. I would like to highlight 2 areas that have not been adequately explored as to their benefits vs cost. First: one of the most important segments of rail not owned/controlled by MassDOT is the Attleboro Secondary (ATS), between Taunton and Attleboro. One failure of South Coast Rail has been focusing on rail transportation between South Coast communities and Boston, while ignoring an equal or greater need for transportation between Providence RI while also bypassing Taunton (East Taunton is no better than going to Mansfield or Attleboro). Utilizing the ATS would allow: Rail service connecting Taunton, SC communities, and other communities (Cape, Buzzards Bay, Middleboro, etc) with PVD, Amtrak, TF Green Airport and more. Direct Amtrak service between NYC and the Cape (seasonal or year round), and connections at PVD to/from SC Communities via MBTA service. Increased service on SCR/Middleboro line during peak hours bypassing choke point, by routing returning (less demand) via Foxboro and ATS. Second: An additional bridge crossing to Cape (Marion-Pocasset) would allow development of Otis as a Regional Airport serving Cape and SC communities, linked via rail to/from Boston and Providence, reduce volume of traffic on other new Cape Bridges, shorten drive time/distance for many going to/from Cape.
19	There should be really plans timeline goals for implementation or regional rail frequent service, North-south rail link, and funding for decarbonizing the MBTA. Additionally there is a lack of meaningful targets for safe bike network infrastructure and reducing average vehicle speed on roads with pedestrian usage.
20	There is a strong desire to expand passenger rail service in the Berkshires, both west and east to Albany and Boston and south to New York City. Despite numerous obstacles, the success of the Berkshire Flyer demonstrates that passenger rail service is a viable mode of transportation. While the Vision and Values statements for the Destination Connectivity priority area somewhat reflect the need for improved passenger rail options, this is not accurately addressed in the Problem Statements on page 77. This could be best addressed by adding the sentence “Current passenger rail service opportunities for the western half of the Commonwealth are extremely limited.” To the end of the third problem statement on page 77.
21	Passenger rail is specifically addressed in Action Items RAI 1.6 and DCAI 3.3. Both Action Items would be strengthened by a commitment to specific implementation milestones to achieve expanded rail service. It is recommended that the last sentence of Action Item RAI 1.6 “Similarly, RTD will continue efforts to develop Compass Rail.” be modified and included as its own individual action item. We recommend “Continue efforts to expand Compass Rail with a defined Mission Statement, key milestones, and implementation schedule.” Ideally, this would have a “Short Term” timeframe.
22	The Destination Connectivity Problem Statement 3 rightly identifies the problem residents in rural areas face regarding the lack of transit services and lost opportunities. However the Action items do not adequately address those problems. For instance, there is no mention of the Northern Tier Passenger Rail effort. North Adams has some of the lowest median wages in the state. Passenger rail service would provide opportunities for those residents. In Berkshire County, many of the employees that support the region’s tourist economy which is concentrated in South County live in the Gateway City of Pittsfield, which is in the central part of the county. A short line passenger rail service between Pittsfield and south Berkshire County on track MassDOT owns and where the Commonwealth has recently invested millions of dollars to improve the track could provide economic opportunities for those residents as well as significantly support the Berkshire economy . In addition to DCAI3.3, an action item should

Comment Number	Comment
	be added stating MassDOT's commitment to seek out and explore other options for passenger rail service.
23	Inclusion of the Northern Tier Passenger Rail Plan I was surprised to see no mention of the Northern Tier Passenger Rail study in the Draft Plan. The public meetings for this project have been very well attended by citizens, municipal officials and legislators. There seems to be broad support for the project's potential as a mobility option, a greenhouse gas reduction strategy and an economic development tool. The Compass Project which may be further along in the planning process, was mentioned several times in the Draft Plan but there was no reference to the Northern Tier project. I heard reference to the Compass Project at the Northern Tier meetings. There were discussions of how connections between the two to connect the northern and southern parts of the Commonwealth could benefit the local communities and the Commonwealth as a whole. Both these projects are needed. Since we are talking about a 2050 planning horizon I would hope to see the Northern Tier project identified and referenced along with the Compass Project every time the Compass Project is referenced in the final draft.
24	Expansion of passenger rail has been consistently identified as a top priority of Massachusetts citizens, especially in western Massachusetts. To create a more expansive and responsive passenger rail system will take money but will also take the prioritized commitment of MassDOT. We recommend that the Plan give greater attention to the implementation of the Compass Rail Plan, include passenger rail expansion on the Northern Tier and the needed Springfield improvements to reduce travel time on Vermonter/Valley Flyer line.

1.12 Mode Shift

MassDOT believes in the criticality of mode shift with respect to meeting a host of goals not only for the quality and reliability of the transportation network, but for meeting the state's environmental and sustainability goals as well. Mode shift helps reduce vehicle miles travelled (VMT), which is otherwise primarily driven by a reduction in overall trip-making. MassDOT's commitment to encouraging mode shift is demonstrated throughout the Beyond Mobility plan and referred to in several Vision and Values statements that define our six priority areas. Additionally, several Action Items defined under various priority areas encourage investment in and expansion of non-vehicular travel services and infrastructure, with the ultimate goal of promoting use of non-vehicular travel modes.

As the document establishing the strategic vision, values, and activities that the MassDOT will undertake, those policies and processes that execute Beyond Mobility's directives will also be updated. These include MassDOT's framework for performance evaluation and target-setting, which is an ongoing and iterative process that culminates with the publication of the yearly MassDOT Tracker report. Chapter 6, Performance-Based Planning, introduces a number of measures that could be implemented to quantify progress on various Action Items.

Unlike MassDOT's system performance targets, those set by other agencies such as the Executive Office of Energy and Environmental Affairs (EEA) are regulatory in nature. Statewide greenhouse gas (GHG) reduction targets for transportation are established in the Massachusetts Climate and Clean Energy and Climate Plan (CECP) for 2025 and 2030 per 2021 law. MassDOT and EEA are

strong partners in leading initiatives intended to meet these targets and will be responsive should further transportation-based emission regulations be enacted.

Table 12 Comments on Mode Shift

Comment Number	Comment
1	"By 2030, Massachusetts will need to have 900,000 new electric vehicles (EVs) to meet climate goals.45 While vehicle cost and range are the largest barriers to those interested in buying an electric vehicle, seven percent of survey respondents cite the availability of charging on, or adjacent to, highways as the most important barrier to buying an electric vehicle." Or you could shift at least some of those trips to transit, walking, and biking.
2	For the problem statement: "Transportation is the largest contributor of Massachusetts' carbon emissions and traaddnsportation-related emissions are disproportionately concentrated in historically marginalized communities." You should figure out a way to measure mode shift.
3	Explicitly plan for modal shift and provide the funding that requires for expansions in transit infrastructure.
4	I am impressed with the work that has gone into this plan, the future model scenarios and the effort to get resident input. I am a bike commuter in Springfield and travel to Boston a few times/ month for work. The streets are filled with broken glass and I play chicken with cars, busses and trucks to get to work on my bike. When I go to Boston, I wish I could easily take a train from the recently renovated station in Springfield. I FULLY support moving infrastructure away from cars and towards biking, walking and rail.
5	PLEASE focus on modes alternative to cars. We should be doing everything we can to mode shift to mass transit, biking, walking. Supporting these modes will decrease vehicle miles travel, which is an essential part of a greener future. EVs won't solve the problem of congestion or pollution, as they take up the same amount of space as traditional ICEs, and still produce particulate pollution from tire dust and brake wear.
6	Anything involving cars needs to be totally de-prioritized. It should be the priority of the commonwealth to spend more money on non-car transportation than it spends on car transportation, in every part of the commonwealth. Micro mobility (including bikes) and pedestrians need FULL NETWORKS not just disjointed and disconnected paths here and there. So does public transit. Public transit needs to be funded so that it is frequent (< 10 minutes) and runs most hours of the day. We need to STOP WASTING MONEY ON CARS.
7	As an electric car owner, I am biased in favor of electric cars, however if every dollar that went into charging infrastructure, vehicle rebates, etc. just went to diesel buses and trains it would be better for the environment and safety. Obviously we should do both, and have electric regional rail but that's rarely an option. Taxing gas cars might be a good way to make EVs more attractive without any cost to the state.
8	Please Extend Bus 119 Route to Point of Pines FULL SCHEDULE from the NEW FIRE STATION along Revere Beach Blvd. & Ocan Ave to Beachmont Station to Northgate Shopping center. This will SERVE MORE RESIDENTS with BETTER SERVICE than they have now! A way for people to get to and from work. A way to REDUCE the number of cars on streets. A way for people to go to pharmacies, churches, restaurants, shopping malls, stores downtown. THIS WILL GIVE ACCESS TO MORE PEOPLE TO TWO SHOPPING MALLS. People looking to rent or buy need convenient bus service. There is MUCH NEW HOUSING along this extension. MORE people would interested IF THERE IS REGULAR, CONVENIENT BUS SERVICE. Many people have written the mayor of Revere to ask for this. 'EVERY PERSON ON A BUS REPRESENTS ONE LESS CAR ON THE ROAD'
9	I am concerned at the lack of straightforward statements that regional transit authorities like PVTA, MBTA, and GATRA need more funding to do what they do. Electrification and

Comment Number	Comment
	frequency are clearly two very important topics to meeting climate goals and increasing ridership and I am assuming they will be expensive.
10	There is only a single mention of VMT (Vehicle Miles Traveled) in the Executive Summary document, and it appears in an item devoted to studying the impact of congestion pricing. Without a firm, legally-binding, state-level commitment to REDUCING VMT, these plans are a sad joke. Reducing VMT MUST be a primary goal of a transportation plan for the year 2050. By that time, our coastline will have been inundated and we'll be dealing with massive storm surges, excessive rainfall, and extreme heat. The goal of Reducing VMT naturally leads to plans to expand transit infrastructure, expand cycling and walking infrastructure, and supporting widespread land-use and zoning changes to enable people to live closer to the amenities that make day to day living possible.
11	Hello, thanks for this draft. There's lots of exciting stuff in here. It would be great to see some additional elements, as well as more firm commitments based on real metrics and real accountability to those metrics. For instance, we can't just say we want people to use cars less. There needs to be a metrics-based commitment to getting people out of cars, and accountability to those metrics. What happens if the state is failing to meet metrics? There needs to be mechanisms in place to ensure that we can't just fail and get away with it. That doesn't solve the problems at hand. Additionally, we can talk about getting people out of cars til the cows come home, but unless there are real, monetary commitments to critical infrastructure projects that will actually serve to get people out of cars, it's not particularly useful to talk about. We need hard commitments to these projects: - Funding for regional rail, including electrification and ability for more than one (accessible) boarding track at each station station - Red-blue connector - Green line extension further into Medford - Serious discussion of a north-south rail link
12	In addition to defined metrics, clear statements that commit MassDOT to specific actions reinforce critical measures that will support mode shift. We encourage you to reaffirm and clarify commitments to implement Regional Rail and statewide rail connectivity, as well as strategic rapid transit capacity expansion.
13	Additionally, there needs to be more emphasis on Regional Rail. The plan over relies on bus electrification to meet climate goals""this is short-sighted and discards mode-shift as a viable strategy. A comprehensive vision for bus transit within the MBTA and Regional Transit Authorities (RTAs), and a plan for expanding rapid transit capacity linked to highway capacity, bus utilization, and mode shift are missing. To meet the diverse needs of our communities, it is critical to prioritize a robust and integrated public transit network that stretches across the state from Florida to Falmouth.
14	1. We must make a shift from dependency on single occupancy vehicles to greater use of shared / public transportation, 2. We must shift from motorized transportation to active transportation for short trips by making our municipalities more walkable and bikeable.

1.13 Scenario Planning

Thank you to those who provided comments on the Scenario Planning exercise in Beyond Mobility. MassDOT recognizes the importance and criticality of taking into consideration the entire Commonwealth when conducting scenario planning exercises and that what may be forecasted in one region of the state may not be widely applicable to other regions in terms of local economies,

travel patterns, cost of living, and more. Many people have begun to call Western Massachusetts home since the start of the COVID-19 pandemic and many more may seek to move in the future given rising housing and living costs in urban centers in other parts of the state. Geographic equity is a cross cutting theme in the Beyond Mobility plan and is critical to MassDOT's every day work.

Throughout the plan there are identified obstacles and problems specific to the western part of the state, for example under the Destination Connectivity Priority Area, existing challenges are called out, "Residents also express challenges commuting or traveling from the western to eastern sides of the state and recognize the importance of connectivity via non-SOV modes," and "There is a lack of network connectivity in rural areas, particularly related to public transportation including Commuter Rail, trains, and buses. Currently, there is insufficient connectivity and coverage in much of western and coastal Massachusetts. Users describe a fragmented system that prioritizes urban areas like Boston while leaving rural and suburban areas out of the picture." Other challenges identified in the plan specific to communities in Western Massachusetts and in more rural parts of the state include: "Equitable access to transportation is a key element of a connected system. Residents acknowledge that, often, wealthy neighborhoods or downtowns are prioritized, leaving residents in other communities feeling disinvested in and disconnected. This lack of geographic equity leads to higher fares, increased travel time, and large gaps in the transportation network. Ultimately, this leads to lost opportunities and low levels of destination connectivity."

MassDOT recognizes the utility of scenario planning exercises to anticipate what impacts may affect trends in local and regional economies, travel patterns, and population changes. MassDOT also recognizes that this exercise is limited in its ability to forecast exactly what the future will hold for Massachusetts and refers to the exercise as one of many tools to use in building a transportation network for the future, however it may look, across the entire Commonwealth.

Table 13 Comments on Scenario Planning

Comment Number	Comment
1	Overall, a very impressive and remarkable plan and roadmap for MassDOT. As a Western Mass (Pioneer Valley) native and current resident, I do take some issues with the scenarios provided as they are extremely Boston-centric and do not take into account 2 potential trends that could re-shape life in Western MA and Mass as a whole. - One is the high potential for the "knowledge" economy to spread to the highly educated populations of Western Mass. - The second is a trend where scores of people move to Western Mass to work remotely and commute to Boston via east-west rail 1-2 days a week. Both trends could very likely happen. I understand this is not an Economic Development Plan but there are a lot of folks in local, regional, and state government working to boost the knowledge economy of Western Mass and I think this Transportation Plan would benefit from encompassing this scenario. This is a missed opportunity given the lower cost and high-quality of living (and safety from coastal hazards) in this area, and the future of east-west rail. The "Hybrid and Diverse" hints at this possibility with "laboratory facilities centered in mixed-use “villages” in inland areas of the Commonwealth" but it seems to be framed as a negative. Please consider framing this as a positive and don't focus so much on bio-tech sector. Our economy is more diverse than that. I'm also not sure housing prices would soar everywhere. The Close and Connected scenario talks about recent trends reversing/plateauing. Why is it that "knowledge inside 495, industrial outside" is maintained? First of all, that ignores the existing diverse economy of Western Mass and seems to maintain the geographic inequities

Comment Number	Comment
	that exist in Mass. I fully support all the transportation related initiatives. However, my fear is that by codifying these scenarios in a State document that will serve as a roadmap for 25 more years, it will serve to further close-off Western Mass from the economic opportunities in the Boston Metro Area.

1.14 Accessibility

Thank you to those who provided comments on the Beyond Mobility plan regarding accessibility and supporting the transportation needs of those with disabilities and other unique mobility needs. MassDOT recognizes that a universally accessible transportation system benefits not only those with disabilities or other mobility needs but everyone. There remains work to be done in order to achieve a universally accessible transportation system and to this end, MassDOT has identified the following problem statements in the plan and associated action items:

- Travel Experience Problem Statement 3: "Transit riders, people with disabilities, and limited English proficient (LEP) community members find it challenging to understand and navigate transit infrastructure, including stations, service changes involving diversions, and alternative routing options."
- SAI3.1: Sidewalk and bicycle facility gaps. MassDOT will continue to develop and prioritize an inventory system of the bike and sidewalk networks throughout the Commonwealth while accounting for facility condition and ADA accessibility issues, with a priority on Gateway Cities and rural areas.
- DCAI2.1 Funding program for multimodal transit connections. MassDOT will create a new program (either as part of the Capital Investment Plan or as a state-funded grant program) intentionally prioritizing a list of non-vehicular modernization projects. This program could potentially start with projects on state-owned roadways that contain MBTA or RTA stops (including flag stops) or stations, to promote access to transit and ADA accessibility.
- DCAI2.3 Municipal Sidewalk Program. MassDOT will explore the creation of a new sidewalk formula program for municipalities to support expansion, accessibility, maintenance, and operations (including supporting snow and ice operations) of local networks.
- DCAI4.1 Vehicle vs. transit accessibility ratios. MassDOT will analyze and compare accessibility outcomes for vehicle versus transit trips to better understand the competitiveness of transit versus private vehicle travel in the interest of improved and more efficient transit service planning.
- TEAI3.1 Station and vehicle improvements. The MBTA and RTAs will continue to invest in station and vehicle improvements that increase accessibility for people with disabilities including installing new elevators in stations, enabling the real-time broadcast of information audibly and visually, purchasing new buses, and launching initiatives that provide riders with accessibility resources. Those stations, stops, and vehicles that are currently inaccessible will be prioritized.

In response to comments received during the Beyond Mobility comment period, MassDOT has added the following Action Item as a commitment to further expand upon work to improve ADA accessibility: DCAI2.4 Americans with Disabilities Act (ADA) Transition Plan Update. MassDOT will continue efforts to update its ADA Transition Plan by 2025, which will include a new sidewalk accessibility assessment and updates to MassDOT's curb ramp inventory. This assessment will document (among other items) missing ramps (coordinates of the locations); ADA compliance for each ramp; ramps at driveways; ramp cracking and other defects; and ramp material types.

Additionally, MassDOT has added the following Action Item as a commitment to further study the needs of people with disabilities as part of a separate effort: TEA2.3 Issue briefs for traditionally underrepresented communities. MassDOT will develop issue briefs that more fully document unique transportation challenges and concerns of traditionally underrepresented demographic groups. These groups include but are not limited to people with disabilities; residents of rural communities; people of color; older adults; the LGBTQIA+ community; Asset Limited, Income Constrained, Employed (ALICE) people; the immigrant community; women; indigenous people; and youth. These Massachusetts-specific issue briefs will provide an in-depth summary of these communities' unique transportation needs and document action items and best practices for addressing them.

Table 14 Comments on Accessibility

Comment Number	Comment
1	National Grid, Verizon and other utilities should not be allowed to place poles within sidewalks and other pedestrian pathways that force specifically wheelchair bound pedestrians to move onto the roadway to pass. There are a variety of poles all around Swansea prohibiting safe passage because they are placed directly in the sidewalk. A National Grid representative stated publicly that they prefer that method for their systems. It blocks ADA-guaranteed access and is a direct contradiction of the tenants of the ADA.
2	Thank you for all your work in an effort to meet the public's transportation needs. I am a commuter rail passenger, clinical social worker, and parent to a child who is blind and also uses a wheelchair. In order to ensure we are meeting ALL community members' mobility needs, we need to see more specific/intentional plans to support the mobility of persons with disabilities. I'd suggest that each priority area have a section that addresses a plan for meeting the needs of people with disabilities. I am not seeing any plans addressing the accessibility, safety, equity, etc. needs of persons with disabilities. According to Massachusetts Rehabilitation Commission, "In 2019, there were 6,821,140 individuals living in the community in Massachusetts, of which 787,330 were persons with disabilities; a prevalence rate of 11.5%." The voices/input of persons with disabilities, and their families, etc. should be uplifted/prioritized in this process. Centering the input of members of the heterogeneous disabilities' community helps ensure that targeted/essential mobility needs are met and experienced by ALL passengers (universal design). Universal design matters. Access matters. Mobility matters -- especially to those who need public transportation for work/leisure/social engagement. Please make sure to infuse accessibility needs of persons with disabilities into this important long-term planning.
3	goodmorning, I live in Western Ma. Turners falls, and voices from the entire state are important in your beyond mobility plans. accessible routes, ada sidewalks, accessible vans, Amtrack(next towns) and few buses traverse here. MOre to be done for accessible boarding for local bus service, shelters,, accessible buses. and realize we need help for sidewalks, as seniors do not use bikes. accessible boarding for amtrak in Greenfield, Ma. sidewalks on bridges, crosswalks, .. thanks you for your response, betty tegel/ advocate

Comment Number	Comment
4	Yes, I certainly agree that there's certainly room for improvement in providing some extra bus or commuter rail transportation to heavily traveled areas for persons w/ disabilities (i.e. Solomon Schecter School in Newton & JFCS in Waltham, respectively). Beth Budner, Auburndale, MA!
5	Please Please Please include Berlin, Massachusetts in your travel area. No one services Berlin, MA. Aging on the Council only has one part-time van and it is always occupied by medical appointments for seniors first therefore no other rodes can be booked. I'm a person with IDD, Trisomy 21, and need transportation from my home in Berlin to get to and from my job, doctor appointments and other social activities. Every other town that surrounds Berlin such as, Hudson, Clinton, Marlborough all have door to door paratrasit accessible to them but I do not. Thank you for your time and consideration. Denise and Jasmine
6	I hope this message finds you well. I wanted to share some thoughts on MassDOT's Beyond Mobility statewide long-range transportation plan, particularly concerning accessibility. While the plan presents a promising vision for the future of transportation in Massachusetts, I believe there's an opportunity to prioritize accessibility even more for all residents, especially those with disabilities, those in underserved communities who may not be able to provide their opinion, and for those who are unaware of these services. Here is a bullet point list to highlight my ideas: • Improve access to public transit stations, bus stops, sidewalks, and bike lanes for everyone's safety and convenience. • Invest in accessible vehicles and technologies, such as low-floor buses and real-time transit information systems, to improve accessibility for people with disabilities and promote transit services for newcomers. • Make transit times accessible throughout the day to accommodate late-night workers and ensure safety for those out at night. • Enhance sidewalk infrastructure, particularly in high-traffic areas, to provide safe and comfortable walking options for all ages, addressing concerns raised by community members, including youth, about safety on busy roads.
7	We need more low cost or no cost transportation options for people with disabilities who do not drive.
8	There needs to be safe, reliable, timely transportation for those with intellectual disabilities.
9	Although the introduction of the Ongoing Travel Experience Efforts section references travel experience as the ability to use Massachusetts transportation system with comfort and ease, it is crucial to emphasize the word accessibility. While you touch upon affordability and wayfinding, it's equally important to include accessibility.
10	Although the introduction of the "Ongoing Travel Experience Efforts"□ section references travel experience as the ability to use Massachusetts' transportation system with comfort and ease, it is crucial to emphasize the word accessibility. While you touch upon affordability and wayfinding, it's equally important to include accessibility.
11	Although the MassDOT guidelines state that it is "consistent with all applicable accessibility standards and guidelines and shall maintain equal access for disabled individuals, as required by the Americans with Disabilities Act, it is crucial to design and implement accessible bus stops with the input and perspective of people with disabilities, who directly face unique challenges in navigating built environments.
12	- Accessibility considerations should not be sidelined in favor of other urban planning objectives and should be included in the planning and design process from the beginning. Considerations for individuals with disabilities must be central to decision-making to ensure that infrastructure changes like floating bus stops and bike lane installations do not create barriers to access or roll back progress made in improving accessibility in other areas, such as bus services. - The perspectives and experiences of people with disabilities are important in identifying potential obstacles and developing effective solutions. Collaborative efforts involving stakeholders from the disability community, transportation agencies, urban planning groups, and biking groups can lead to more inclusive design outcomes.

Comment Number	Comment
	- While guidelines may exist to promote accessibility and safety, effective enforcement processes are important to ensure compliance. Efforts to raise awareness among all road users, including cyclists, about their responsibilities and the importance of adhering to regulations can contribute to safer and more accessible environments. Travel Experience Problem Statement 3: Transit riders, people with disabilities, and limited English proficient (LEP) community members find it challenging to understand and navigate transit infrastructure, including stations, service changes involving diversions, and alternative routing options. - The MBTA effectively provides both visual and audible information concurrently. - Issuing audio-only messages over a microphone constitutes an accessibility violation, despite its widespread acceptance in the transit industry. - Implementing a redundant announcement backup system within train cars is essential to mitigate failures in the station system. - Communication technology should not exclusively rely on smartphones, as this excludes individuals with lower incomes or limited access to technology and Wi-Fi or the inability, because of disability or health condition, to use a smartphone. - There is a need for increased regulation concerning real-time information. - Audible announcements should be available at all bus stations, not just centralized hubs. - Both bus and train operators must adhere to consistent standards for ensuring that all announcements are relayed when the automated speakers are inoperable. - Ensure visual boards and audible announcements are present throughout the system, utilizing high-contrast colors and minimizing flashing lights. o The transit industry's reliance on low-resolution, dot-matrix light-emitting diode (LED) screens is problematic. These screens have severe character limitations, fail to capture people's attention effectively (lacking features like color, animation, images, or video, especially crucial during emergencies), and are unable to leverage modern web-based technologies. o Due to the absence of ADA guidance for character heights on digital signage, it's essential to align all digital signage information with ADA guidance for character heights on static signage (ADA Table 703.5.5). This aspect should factor into determining the "minimum distance from a screen on a subway platform." - Consider establishing designated signage information areas. o Implementing either a strict information hierarchy or segregating types of digital signage can ensure that critical transit rider information (emergency updates, arrival times, service details) remains distinct from marketing, public service announcements, and other secondary information, etc.). o Installing screens exclusively at recognized decision points is crucial. A scattered deployment lacking coherence regarding information availability risks failure. o Priority should be given to installing primary screens""those addressing transit riders' primary information needs""overhead. - To adapt to evolving technology, it's crucial to utilize wording that encompasses the latest and most pertinent assistive technology instead of specifying a particular technology (ie. Application). - People serve as the most effective wayfinding mechanism; therefore, stations (system-wide) should be staffed with an adequate number of transit personnel who can offer assistance to passengers. - Opting for lower-tech solutions involving human assistance proves to be both cost-effective and efficient for wayfinding. - Eliminating any visual clutter that detracts from directional signage in stations is crucial. - Many individuals rely on buttons to request assistance, yet many of the push buttons within the elevator system are functional. - It is essential to have a minimum of two elevators in transportation facilities. - When both ramps and elevators are present: o Ramps should be protected by a canopy to prevent weather-related damage. o Regular maintenance to clear ice and snow from ramps is necessary. o Rest areas or benches should be provided along ramps for individuals to rest. o Elevators must be maintained in a clean and sanitary condition at all times of operation. - The accessible pathway must be the shortest and most convenient pedestrian route in and around a station or stop, making it the preferred route for users of all abilities. - Accessible paths of travel should align with stairs. If the endpoints of all vertical circulation elements are not aligned, priority should be given to designing the endpoint closest to the public way to align.

Comment Number	Comment
13	Page 77 Problem Statement 3: The focus needs to be on access to the necessities in life such as medical and economic, not cultural opportunities.
14	Please expand and provide for more affordable on demand transportation for people with disabilities. Thank you!
15	We don't have any public transportation where I live. I have a disability and I am unable to get where I need to go.
16	I have places where I want to go. I am in a wheelchair. I can't always get there because of staff, but if there was a wheelchair van I could go more places.
17	I have a disability. I can't get to meetings and things from where I live to Worcester because I don't drive there. I need on demand transportation that is affordable.

1.15 Roadway Safety and Speeding

Thank you to those who provided comments on the Beyond Mobility plan regarding speeding and safety concerns of vehicles. MassDOT is committed to a safe-systems approach to safety and recognizes that reducing vehicle speeds is one of the primary ways to address injuries and fatalities on our roadways. Addressing speeding and other unsafe driving behaviors on our roadways is identified in various action items throughout the Beyond Mobility plan. These include:

- SAI1.2 Tracking safety action plans + prioritization plan.
- SAI1.4 Tracking crashes through an equity lens.
- SAI2.1 Back-casting toward Vision Zero. In line with the “back-casting” approach (identifying the actions closest to the achievement of a long-term target) MassDOT will define a series of actions working backwards from zero long-term fatalities and serious injuries on all roadways in Massachusetts and implement those activities. Among other initiatives, this will involve the continued data-driven implementation of systemic improvements and intersection safety interventions prioritizing areas with the highest crash rates with a focus on social and geographic equity.
- SAI2.2 Funding towards areas driving high fatality rates.
- SAI2.3 Systematically invest in and deploy low-cost interventions with proven safety benefits.
- SAI5.1 RMV guidelines. MassDOT’s RMV will perform a formal review of and update the driver’s education curricula to promote road safety by educating bicyclists, pedestrians, and motorists to be aware of their actions as they travel.
- SAI5.2 Driver education content.
- SAI5.4 Education resources for new drivers.

As stated in Beyond Mobility and in MassDOT's most recent Strategic Highway Safety Plan, MassDOT is committed to Vision Zero goals and recognizes the many steps it will take to realize this vision.

Table 15 Comments on Roadway Safety and Speeding

Comment Number	Comment
1	"Residents perceive an unsafe environment Number of safety events resulting on public transportation." Provide education on the relative safety risk of driving compared to transit. Even at its absolute worst the T is meaningfully safer than driving, but the coverage does not give this impression.
2	"Through its ongoing initiatives and projects, as well as additional Action Items described in Chapter 5, MassDOT aims to address the disparities in travel time across modes presented here to make transit travel times more competitive with driving." Make driving less convenient. While speeding up transit times should be a huge part of this you should also make driving slower. So much money has been spent shaving fractions of a second off drive times at the expense of everything else. Start doing that everything else at the expense of drive times. Make places for people first, not for driving through. Take the highways out of the cities. Slow speeds down so every city street is safe enough for children to play.
3	I would like to see a rudimentary analysis of those paths and routes with portions designated as bicycle routes and paths to assess if they conform to the Engineering Directive from MassDOT dated 1/2/2020 establishing new Controlling Criteria for Bicycle Facilities. I understand that infrastructure is expensive and takes time to build. However, on any portion that does not have conforming facilities, I would like to see the speed limit reduced to 35MPH until the roadway is made conforming. Changing speed limits is relatively cheap and one of the biggest factors in accident outcomes.
4	I also hope to stop using the 85th percentile rule when determining road speeds across the state. It does not reflect what speeds should be, and can be weaponized to promote car traffic over other modes of transportation.
5	There appears to be a conflict between Action Items that improve Safety and those that improve Reliability. Action items that improve Safety (SAI2.2 and SAI2.3) may negatively impact Reliability and Reliability action items (RAI1.4) may not improve Safety. MassDOT should consider adding additional detail to Chapter 5 to clarify and coordinate safety and reliability action items. Safety Action Items SAI5.1, SAI5.2, and SAI5.4 appear to address education for new drivers but do not include information on how MassDOT can continue to educate all drivers (not just new drivers) on new laws and reinforcement of existing laws. We recommend that SAI5.4 be changed from “Education resources for new drivers” to “Education resources for all drivers” to clarify the need for education for both new and experienced drivers. It is also recommended that SAI5.1 and SAI5.2 be modified to clarify that updated educational resources will be developed for all drivers.
6	One major area that needs to be addressed as part of the SAFETY effort is the matter of e-bikes and delivery drivers. Every day in Boston is like a scene out of Mad Max. They go 30 miles an hour, ignoring automobile laws, and abusing the bike lanes, going the wrong way, etc. It is literally a fatality waiting to happen.
7	It’s very important to me that the plan pushes for safety: This means no fatal crashes or serious injuries on roads, rails, bikeways, or paths, and that all intersections and crossings be updated to safe design standards. That means NO AI should be included!! AI has a terrible record of directing people down dead ends and off bridges. Drivers need to think for themselves!!
8	Enforcement of speed limits, regulations against driving on shoulders, aggressive driving, and obscured license plates should be rigorously pursued and offenders duly penalized.
9	Safety action items SAI3.2 and SAI3.4 related to Sidewalk Performance Measures and Prioritizing Maintenance Activities should be amended to specifically call out maintenance of crosswalk markings. Additionally, consideration should be given to including an action on

Comment Number	Comment
	maintaining roadway pavement markings as a safety measure and including an action item in the appropriate section.
10	Safety is paramount when addressing the future of transportation in the Commonwealth. Safety was the first component of our vision statements in each of our transportation areas of focus. Traffic congestion and accidents are both an economic and quality of life concern, and these impacts should be considered when prioritizing the allocation of transportation investments. The Beyond Mobility plan identifies safety concerns as a deterrent to increased utilization of alternative transportation modes. The Partnership believes the region's transportation options should be safe and reliable; achieving this aim is essential for residents to explore alternatives to single-occupancy vehicle commuting, and thus reduce roadway congestion.

1.16 Vehicle Safety and Design

MassDOT recognizes the role it plays as an agency in affecting change when it comes to vehicle design and the criticality that vehicle design plays in reducing roadway fatalities and injuries. To this end, MassDOT has identified vehicle design in one of the Safety Action Items in Beyond Mobility:

- SAI2.5 Vehicle design. Consistent with the SHSP, MassDOT will take an active role in affecting change in vehicle design (e.g., vehicle size, use of sideguards), which is a significant factor for injuries sustained in the instance of a crash. In the short term, this analysis will include a review of the impacts of electric vehicle specifications including weight on crash severity.

Table 16 Comments on Vehicle Safety and Design

Comment Number	Comment
1	"Massachusetts traffic fatalities and fatality rates have risen since 2019, despite lower vehicle miles travelled." Study the role of vehicle size, hood height, and weight as a contributing factor for this and develop policies disincentivizing dangerous designs.

1.17 Transportation Integration with Land Use, Housing, and Economic Development

Thank you to those who provided comments on the intersection of transportation, land use, housing, and economic development and its criticality to the goals, visions, and action items outlined in the Beyond Mobility plan. MassDOT acknowledges the important role between land use and transportation in achieving climate goals and improving access to critical destinations. One problem statement in the Beyond Mobility plan reads, "Existing land use patterns reinforce vehicle travel and exclude many Massachusetts residents from having sufficient modal choices." In response to this problem, Action Item DCAI5.1, "Identify areas for high-impact transit-oriented investments, both in the MBTA service area and elsewhere in the state," calls for the future study of areas across Massachusetts in need of improved connectivity between land use and transportation policies and transit-oriented development across all of our communities.

In response to many of the comments received on land use and housing, the following language has been added to DCAI5.1, "'Identify areas for high-impact transit-oriented investments, both in the MBTA service area and elsewhere in the state:' Outside of the MBTA service area, particular attention in this analysis will be paid to areas where there is existing or planned passenger rail service as part of the Compass Rail initiative."

Table 17 Comments on Transportation Integration with Land Use, Housing, and Economic Development

Comment Number	Comment
1	Equally concerning is the limited connectivity to land use policy across the state. As we anticipate significant growth in population and housing by 2050, transportation planning must align with land use policies to sustainably accommodate this growth without increasing VMT.
2	Very thorough assessment, and a plan to address problem areas. One caution - do not isolate to transportation, but rather consider integrated plan with housing and economic development. By distributing these other developments to various areas around the state, and tightly integrating housing, commercial and recreational development within these communities, the State will be able to lessen transportation demand. Otherwise we will always be fighting a losing battle.
3	Something of note is transportation systems are tied deeply to other aspects of our society - and improving transportation will have to reach outside of its bubble. For example, transportation is most cost effective when it can serve many people in a small area ("hubs"). Parking mandates and exclusionary zoning prevent this kind of gathering, making transportation less effective.
4	Codify transportation safety by contextualizing road segments with land use.
5	These are the most important hurdles in this layman's opinion. I want to like living in Massachusetts but the quality in roads, other drivers, and general travel infrastructure leaves a lot to be desired. I believe in scrapping a system that's been built on so much it is not longer an efficient system, which I feel is the situation we're in. The Big Dig took a long, long time...but I haven't met a single person that's upset with the results. It is worth investing in our future, not just the present moment. I currently feel as though I'm being taken advantage of by Massachusetts, we pay a lot in taxes and I can't drive to work without worrying about getting a flat tire...and this is just between Salem and Swampscott.
6	People looking to rent or buy need convenient bus service. There is MUCH NEW HOUSING along this extension. MORE people would interested IF THERE IS REGULAR, CONVENIENT BUS SERVICE. Many people have written the mayor of Revere to ask for this. 'EVERY PERSON ON A BUS REPRESENTS ONE LESS CAR ON THE ROAD'
7	An additional bridge crossing to Cape (Marion-Pocasset) would allow development of Otis as a Regional Airport serving Cape and SC communities, linked via rail to/from Boston and Providence, reduce volume of traffic on other new Cape Bridges, shorten drive time/distance for many going to/from Cape.
8	In section 5.5, the Destination Connectivity introduction, MassDOT highlights the initiatives taken to promote access to and from critical destinations that provide opportunities and call for the need to address the housing and land use context on network operation. There is, however, a missed opportunity related to Compass Rail to promote and support greater density near intercity passenger rail service stations. An action item should be added or integrated into related action item to promote and support greater housing density near intercity passenger rail areas. Action Item DCAI5.1 related to the identification of areas for high-impact transit-oriented investments should also focus on passenger rail connection points.
9	We recommend enhancing the connectivity between transportation and land use policies to ensure that future development is efficient and responsible.

Comment Number	Comment
10	MassDOT should coordinate with other statewide agencies to ensure progress on climate goals and to support housing production. MassDOT will need to coordinate with other statewide agencies to meet the objectives set out in Beyond Mobility. Concerning public EV charging infrastructure, MassDOT should explicitly plan to coordinate its efforts with the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) and the other participants in the Electric Vehicle Infrastructure Coordinating Council. MassDOT should also coordinate with the Executive Office of Housing and Livable Communities to support sustainable land-use policy that promotes dense, transit-served development and sustainable industry.
11	MassDOT must prioritize enhancing connectivity between transportation and land use policies to ensure that future development is efficient and environmentally responsible. Massachusetts will need to build more than 500,000 new homes by 2050. If we are to meet our climate goals, the Commonwealth must closely coordinate this housing development with the transit development that will serve it. Without such coordination and concerted effort to integrate transportation and land use planning, the state risks exacerbating congestion, greenhouse gas emissions, and inequitable access to housing and transportation options.

1.18 Age-Friendly Planning

Thank you to all those who provided comments on the Beyond Mobility plan and the importance of age-friendly design and planning in MassDOT's work. Ensuring our transportation system at all levels is universally accessible will not only benefit older adults and others who face mobility challenges but every user of the system. A universally accessible transportation system takes shape in many forms from accessible transit vehicles with no stairs and ensuring the height of platforms align with train doors, amenities such as seating and lighting, and planning transit routes and schedules that take into account those who cannot or do not choose to drive.

The Beyond Mobility Plan identifies action items to achieve a more universally accessible system such as:

- TEAI3.1 Station and vehicle improvements. The MBTA and RTAs will continue to invest in station and vehicle improvements that increase accessibility for people with disabilities including installing new elevators in stations, enabling the real-time broadcast of information audibly and visually, purchasing new buses, and launching initiatives that provide riders with accessibility resources. Those stations, stops, and vehicles that are currently inaccessible will be prioritized.

- DCAI2.1 Funding program for multimodal transit connections. MassDOT will create a new program (either as part of the Capital Investment Plan or as a state-funded grant program) intentionally prioritizing a list of non-vehicular modernization projects. This program could potentially start with projects on state-owned roadways that contain MBTA or RTA stops (including flag stops) or stations, to promote access to transit and ADA accessibility. Environmental Justice communities where there are network gaps referenced in the NextGen Bike/Pedestrian Vision initiative, high potential for everyday walking and bicycling and that contain transit stops, and that receive less investment dollars than other places, will be prioritized as part of this framework.

- DCAI2.3 Municipal Sidewalk Program. MassDOT will explore the creation of a new sidewalk formula program for municipalities to support expansion, accessibility, maintenance, and operations (including supporting snow and ice operations) of local networks.

- DCAI4.1 Vehicle vs. transit accessibility ratios. MassDOT will analyze and compare accessibility outcomes for vehicle versus transit trips to better understand the competitiveness of transit versus private vehicle travel in the interest of improved and more efficient transit service planning.

In response to comments received during the Beyond Mobility comment period, MassDOT has added the following text to Safety Problem Statement 3: "Older adults are particularly vulnerable to serious injury or death when they are involved in crashes as pedestrians" as well as the following additional text Safety Action Item 3.3: "MassDOT will also explore 'dementia-friendly' design considerations presented by the Massachusetts Executive Office of Elder Affairs"

Additionally, MassDOT has added the following Action Item as a commitment to further study the needs of older adults as part of a separate effort: TEAI2.3 Issue briefs for traditionally underrepresented communities. MassDOT will develop issue briefs that more fully document unique transportation challenges and concerns of traditionally underrepresented demographic groups. These groups include but are not limited to people with disabilities; residents of rural communities; people of color; older adults; the LGBTQIA+ community; Asset Limited, Income Constrained, Employed (ALICE) people; the immigrant community; women; indigenous people; and youth. These Massachusetts-specific issue briefs will provide an in-depth summary of these communities' unique transportation needs and document action items and best practices for addressing them.

Table 18 Comments on Age-Friendly Planning

Comment Number	Comment
1	As a Senior I find the newer model trolleys and buses with stairs in the center to be dangerous for commuters, and a waste of valuable space. There's also the issue of the height of the steps at the entrance/exits to the trolleys, which are considerably high for anyone that has balance or mobility issues which creates a danger when entering or exiting the trolley. Buses can be lowered to accommodate a mobility issue, trolleys can't. Please keep Seniors and Mobility Issues in mind re: transportation equipment purchases.
2	Downtown and back bay have more bus routes. I am a senior not a car owner and frequent Copley and would like to go to Downtown Crossing. Bus 55 used to go there. Not anymore. Please replace. Even if it's weekdays from 10:00 am to 5:00 pm. And there would be a stop to allow us to get off to shop on Charles Street. Seniors need more options to get around Boston proper
3	When unable to drive or no longer able to drive due to aging, no family in the area, getting anywhere is unaffordable, not safe, not clean, not available.
4	I no longer have my driver's license. Hence, I am at the mercy of others and/or learning other ways to do online Hence, my need/reason to turn to MASS Gov on line. Upon many failed attempts and much frustration I finally completed the application form(s) EXCEPT for the last requirement.... an appearance at the local RGM office (Easthampton) which is about 8 miles from where I live, and I have no car and no license. I will be 90 yrs. old on my next birthday and in dire need of acceptable identification, Transportation is a/the problem for me. My question is--is there another way (for people my age) to complete the process online or email attachment?.
5	Thank you for being inclusive of older adults as part of the plan.

Comment Number	Comment
	We suggest an additional problem statement and corresponding action items to address how older adults are disproportionately impacted in pedestrian accidents and fatalities. We support and suggest advancement of mobility managers that can assist older adults and people living with disabilities to access public transit. We support increased safety and improved wayfinding around bus stops and suggest prioritizing the installation of benches (with backs and arms) at bus stops. We support MassDOT's attention to snow and ice management in this plan as it can make the difference between older adults traveling outside of the home in winter months, whether for exercise, social engagement, or to obtain basic necessities. We encourage MassDOT to continue the trend of including older adults in how funding programs prioritize projects - Complete Streets and the Shared Streets and Spaces Program are great examples. We also encourage MassDOT to explore "dementia friendly" design considerations, which are outlined Here: https://www.mass.gov/doc/af-df-design-considerations-for-physical-infrastructure-0/download We encourage MassDOT to create workshops that digital navigators can use to assist older adults and other in connecting with online resources for transit access.

1.19 Electric Vehicle Charging

Thank you to those who provided comments on the importance of widely available and accessible electric vehicle charging infrastructure and its incorporation in the Beyond Mobility plan. MassDOT has completed an Electric Vehicle (EV) Infrastructure Deployment Plan as required by the Infrastructure Investment and Jobs Act's National Electric Vehicle Infrastructure (NEVI) Formula Program and Beyond Mobility references various parts of the NEVI plan's efforts in the following action item:

- SCTAI2.1 EV Alternative Fuel Corridors. By implementing the MassDOT NEVI Plan, MassDOT will eliminate all gaps greater than 50 miles between 4x150kW fast charging stations on the Federally designated EV Alternative Fuel Corridor network. Federal NEVI Program and CRP funding may be used to support this effort, with the goal of ensuring drivers of personal and commercial vehicles have ease of access to charging on all designated Alternative Fuel Corridors.

Additionally, Beyond Mobility outlines suggested new measures to be included in MassDOT's annual performance report, Tracker, including: the share of vehicles registered in Massachusetts that are EV or hybrid, the average miles per day driven by EV vs. fossil fuel vehicles, and the number of electric charging station sessions (overall and broken down by REJ+ vs. non REJ+ communities and by rural vs. urban communities). These measures will help MassDOT ensure that the implementation of expanded EV infrastructure is done in an equitable way across the Commonwealth.

Table 19 Comments on Electric Vehicle Charging

Comment Number	Comment
1	Low-cost EV charging should be a part of this plan - by strategically placing long dwell EV charging (Level 1) near commuter rail stops, park & rides, bike hubs, etc. we will do more to encourage carpooling, public transit and micromobility. Right now too many people in Massachusetts live out of reach of public transit or micromobility hubs so reliance on passenger vehicles will continue. EV charging can be a "carrot" that incentivizes commuters to choose a hybrid commute method like driving to a park & ride and then carpooling that will reduce vehicle miles traveled, instead of driving their own vehicle all the way to the office. Since EV charging costs are already high and continue to increase it's important to focus on having these be low-cost chargers, i.e. Level 1 chargers that can replenish the mileage used in that commute during the time the driver is at work. By 2050 these chargers will also enable bidirectional charging so that batteries in cars can help to power the grid during high daytime usage hours. It's critical that as many commuter vehicles as possible are plugged into some source during the day to enable grid stability.
2	Clean Transportation: Electrify the public transit system, reduce VMT by at least 25% by 2030 and 50% by 2050, and better collaborate with partner agencies on land use and decarbonization.
3	Finally, with the push to move to electronic vehicles two issues must be addressed. The dearth of "fueling" stations in rural areas needs to be addressed. What is the point of having a vehicle that can only be used in limited areas? The Massachusetts population, as well as the American population in general, is highly mobile for both work and play and the lack of sufficient access to charging stations would impact peoples lives and the economy. The second issue that needs to be addressed is the safety regarding e-cars. There is less of a spontaneous combustion issue with regards to gas powered cars.
4	Need more EV charging stations at all parking facilities around Boston. setup for multiple possible EV car parking configurations. not just a wall mounted charging unit with access only to car space in front. Setup in the middle of pull through parking to allow more cars to access charging cable if another car has completed charging. can switch to another car parked beside or across the charging unit.

1.20 Funding Support for Gateway Cities

Thank you to those who provided comments on the Beyond Mobility plan and the importance of providing funding to Gateway Cities through various MassDOT funding programs. MassDOT, through the Beyond Mobility plan, has outlined various strategies it will implement to prioritize communities across the Commonwealth who need fiscal and other types of support from the agency. These strategies include the following action item from Beyond Mobility:

- SAI3.1 Sidewalk and bicycle facility gaps. Building on MassDOT's Next Generation Bicycle/Pedestrian Vision mapping effort, MassDOT will continue to identify the gaps in sidewalk and bicycle facility coverage that contribute to crashes and prioritize funding to address these gaps. For example, in line with recent research that finds a correlation between gaps and sidewalk coverage and pedestrian crashes, MassDOT will continue to develop and prioritize an inventory system of the bike and sidewalk networks throughout the Commonwealth while accounting for facility condition and ADA accessibility issues, with a priority on Gateway Cities and rural areas.

Further, when considering geographic equity, Gateway Cities are included as part of this commitment and are prioritized for investments to address gaps in infrastructure which contribute to higher rates of crashes, injuries, and fatalities.

Table 20 Comments on Funding Support for Gateway Cities

Comment Number	Comment
1	To ensure equitable access to transportation resources, MassDOT should prioritize funding, such as through programs like Complete Streets, specifically to Gateway cities with low administrative barriers. These municipalities often lack sufficient municipal staff and transportation planners, making it crucial to allocate targeted funding to address their unique transportation needs effectively and promote safer, more accessible streets for all residents.

1.21 Commuter Rail/Contract Workers' Safety and Welfare

Thank you to those who provided comments on the commuter rail contracting process. MassDOT acknowledges the concerns raised.

Table 21 Comments on Commuter Rail/Contract Workers' Safety and Welfare

Comment Number	Comment
1	The state needs to add protections for Commuter Rail workers in the RFP for the "regional rail" operator contract. This must include fair wages and sick time. The practice of letting a low bid contractor increase their profits on the backs of Massachusetts workers must end.
2	Contracting practices should prioritize selecting consultants capable of delivering sustainable solutions rather than exacerbating future issues. Employee welfare should be a central focus, with provisions for adequate personal protective equipment (PPE) and modern technology conducive to efficient work environments. Implementation of a four-day work week option, in addition to work-from-home (WFH) policies, ensures equitable treatment of all employees and addresses individual circumstances that may affect remote work capabilities. Flexible work schedules should be offered to accommodate diverse employee needs.

1.22 Needs of Rural Communities/Geographic Equity

Thank you to those who provided comments as part of the Beyond Mobility comment period regarding the needs of rural communities. A presentation on Beyond Mobility was provided to the Massachusetts Rural Policy Advisory Commission (RPAC) on May 31st, 2024 and the project team received excellent feedback as part of that meeting and through our online comment form. MassDOT recognizes that rural communities in Massachusetts face unique challenges when it comes to mobility, funding, accessibility, electric vehicle charging, transit service expansion, passenger rail expansion, and many other transportation issues. The cross-cutting theme in Beyond Mobility of "Social and Geographic Equity" encapsulates MassDOT's commitment to geographic equity in all of the agency's work. Additionally, special attention was paid during public outreach performed as part of Beyond Mobility to ensure voices from rural communities were heard. Many of

the major themes from our public engagement activities are reflective of rural communities' needs, which then translated into the Plan's problem statements and action items. These include but are not limited to the following:

- Users of active transportation modes like pedestrians and cyclists often experience unsafe, low-comfort, and disconnected facilities, especially in Gateway Cities and rural areas.
- Rural areas have 2.61 times higher percentage of roadway miles at high risk for lane departure crashes
- Inconsistent cellular service in rural areas results in slow emergency response times and more severe crash outcomes
- Around 66 percent of rural respondents from rural communities identified transit system expansion and/or better connectivity and frequency as aspects of a flawless transportation system for Massachusetts
- 57 percent of rural respondents from rural communities selected “transit elements” as their first choice
- Missing sidewalks, curb ramps, and crosswalks limit mobility options, especially for older adults, people with disabilities, and children. This is a particular issue in rural communities, where many such residents live
- Rural communities have 1.65 times more sidewalk gaps as a percentage of total roadway miles, 3.5 times more poor/fair road conditions per capita, 4.4 times more poor/deficient bridges per capita, and 1.3 times more deficient curb ramps than urban communities
- SAI3.1 Sidewalk and bicycle facility gaps. Building on MassDOT’s Next Generation Bicycle/Pedestrian Vision mapping effort, MassDOT will continue to identify the gaps in sidewalk and bicycle facility coverage that contribute to crashes and prioritize funding to address these gaps. For example, in line with recent research that finds a correlation between gaps and in sidewalk coverage and pedestrian crashes, MassDOT will continue to develop and prioritize an inventory system of the bike and sidewalk networks throughout the Commonwealth while accounting for facility condition and ADA accessibility issues, with a priority on Gateway Cities and rural areas.
- DCAI3.1 Expand local and regional funding opportunities for destination connectivity purposes. As increased Federal and state funding becomes available, MassDOT will expand existing programs and develop more robust and targeted funding opportunities focused on closing first- and last-mile gaps to fixed route transit, as well as access to healthcare services, employment, and other critical destinations to include more types of transit service through local transportation providers (e.g., municipalities, non-profits, RTAs, and the MBTA). These programs include, but are not limited to, the Community Transit Grant Program and future discretionary grant programs when funding allows.

Additionally, several performance measures have been identified in the Beyond Mobility plan specifically in response to concerns from rural communities, including:

- Difference of sidewalk gaps as a percentage of total roadway miles between rural and urban communities
- Percent of absolute statewide GHG emissions attributed to transportation sources (in line with the statewide goal to achieve Net Zero by 2050).
- Number of electric vehicle charging stations between rural and urban communities and between EJ and non-EJ communities
- Percent of sidewalk gaps on roadway miles near rural transit stops
- Difference of percent of poor/fair road condition per capita between rural and urban communities
- Difference of poor/deficient bridges per capita between rural and urban communities
- Difference of deficient curb ramps between rural and urban communities

In response to comments received during the Beyond Mobility comment period, MassDOT has added the following Action Item as a commitment to further study the needs of rural communities as part of a separate effort: TEAI2.3 Issue briefs for traditionally underrepresented communities. MassDOT will develop issue briefs that more fully document unique transportation challenges and concerns of traditionally underrepresented demographic groups. These groups include but are not limited to people with disabilities; residents of rural communities; people of color; older adults; the LGBTQIA+ community; Asset Limited, Income Constrained, Employed (ALICE) people; the immigrant community; women; indigenous people; and youth. These Massachusetts-specific issue briefs will provide an in-depth summary of these communities' unique transportation needs and document action items and best practices for addressing them.

MassDOT recognizes the unique needs and concerns of rural residents in Massachusetts. While MassDOT does not currently own any gravel or non-paved roadway facilities and does not have access to funding streams that support their maintenance, we know that many municipalities do, and are facing increasing asset management needs due to challenges introduced by unreliable weather especially in the colder months. MassDOT will continue to explore options for enhancing our ability to provide support to municipalities with these assets, and will work one-on-one with municipalities to craft mitigation strategies that are environmentally responsible and fiscally feasible.

Table 22 Comments on Needs of Rural Communities/Geographic Equity

Comment Number	Comment
1	Why does it seem like the transportation issues focus on urban areas. Distributed working environments may come with their own challenges, but they bring benefits to employers as well as employees. Less stress on population dense areas where traditional work places have collected (rounte 128 and now 495 zones), with the need to better track workers time working at home kind of balance out. The need to force communities to provide affordable housing close to MBTA terminals serves these communities how? Not everybody works in the Boston metro area. This program may only lead to congestion around T Terminals due to parking needs.
2	There needs to be connectivity between communities, as well as to hubs (e.g. Lowell, Worcester, Boston, Hyannis, etc)

Comment Number	Comment
3	We do not have enough transportation out here where I live in Athol. On-demand transportation would also be great if it was affordable.
4	Please don't forget the mobility needs of rural residents and the 2019 Mass Rural Policy Plan.
5	more focus on rural regions and statewide connectivity
6	There should be more in the Plan on work related to dirt and gravel roads. On performance measures, assessing the condition of dirt and gravel roads and then prioritizing them for funding is critical. This is becoming a huge issue, as we continue to encounter more frequent freeze/thaw cycles.
7	I need on demand transportation that is affordable. I travel to many places around the state and have to rely on getting a ride. There is no transportation in my town.
8	Thank you to the entire MassDOT that has been involved in the preparation of this ambitious and important statewide long range transportation plan. The last paragraph of this report sums up the urgency of this work: "A reliable transportation system is critical to ensure that our residents""especially those who do not have the luxury of owning one or more vehicles""can access their jobs, important health care for themselves or loved ones, recreational opportunities, and other places they need to go. Transportation is more than just a way to get around; it is a lifeline. This is why we must continue to move beyond planning for the sake of mobility alone, and toward planning for a sustainable transportation system that prioritizes safe and reliable access to opportunity for those who need it most." For many residents in Massachusetts, especially those in rural areas, they do not have the luxury of choosing between different vehicles, ride shares, modes (including biking or walking), or transportation services -- because often times they cannot afford those options, the options are unsafe (e.g., lack of sidewalks and bike lanes), or they do not exist. The plan references the importance of transportation to rural residents -- among survey respondents, rural residents were by far the least satisfied with transportation connections, and they responded that connectivity should be a top priority. In addition, rural residents expressed dissatisfaction with being able to access key destinations which are critical to overall health, wellbeing, and productivity -- food retailers, educational optional opportunities, and health care services. Historically, there has been underinvestment of transportation in rural areas. While the destination connectivity priority area signals MassDOT's investments in historically underserved communities statewide, it should seek not just to support robust on-demand transit services "especially in communities served by Regional Transit Authorities (RTAs) that may not have and/or lack the density to support fixed-route service," but it should also expand support to non-RTA transit services that operate in regions that have no RTA service at all or no meaningful service. There are many gaps in existing RTA services, and relying just on RTAs to fill that service will be inefficient and ineffective, especially when there are existing independent microtranist providers that are filling that gap and that need access to federal and state funding without onerous requirements for local matches. As an example, the Quaboag Connector rural microtransit service in the Ware region has been described as a lifeline for residents of that region who face many barriers to access to things that many of us take for granted due to the rural nature of the region. Thank you for your consideration. Please reach out for additional information or discussion.
9	At the Rural Planning Commission meeting on May 31, 2024, there was discussion on local unpaved roads. BRPC communities experience similar issues with poor unpaved road conditions and maintenance issues. We strongly support the inclusion of action items in the plan which will lead to improving unpaved road conditions.
10	There should be an emphasis on the need for electric vehicle charging in rural areas.
11	Inclusion and Alignment with the 2019 MA Rural Policy Plan Thank you for addressing rural concerns throughout the report. I worry that, as in the past, rural concerns may one again be left behind as strategies moving forward. The MA Rural Policy Plan, released in October 2019, provides recommendations and suggested priorities to address the concerns of the 170 rural communities in the Commonwealth. As noted in that Plan: - Rural areas of Massachusetts face different challenges than the rest of the Commonwealth. Unlike the economic growth engine of Greater Boston, rural areas

Comment Number	Comment
	are dealing with issues such as: small, aging and often declining populations; limited fiscal resources and staffing constraints; inadequate infrastructure and mobility options; and acute public health challenges. It would be helpful to our under-resourced communities to have a section of a final report where the MA Rural Policy Plan is referenced and where rural concerns are categorized together so they would be easier to track and follow. - Here in North Central MA, many of our rural communities are clustered outside of the small cities of Gardner, Fitchburg, and Leominster which are also dealing with limited fiscal and staffing resources and inadequate mobility options. It's important to note that rural communities have residents who have the same income, language. age and disability classifications as those living in nearby cities with EJ neighborhoods. While there may not be a sufficient concentration to have an EJ designation in these towns, their needs are real and must be addressed as we plan for MA Mobility in 2050. - Access to mobility is not just a problem for under-resourced people living in EJ neighborhoods, it is also a problem for under-resourced people living in neighborhoods that don't have an EJ designation. It is also a problem for people who are not under-resourced but do not have access to a vehicle of can not drive for a number of reasons.
12	The Partnership greatly appreciates the consideration of more rural communities in the discussion on transit connectivity. Ideally, the right mix of services would enable passengers to travel extensively within their own community and between other 495/MetroWest communities, however, the current transportation system in our region cannot support this. The Partnership continues to support innovative First and Last Mile solutions designed to connect transit riders from the rider's point of origin to a transit station, and then from another station to their final destination. First and Last mile solutions should be carefully coordinated and foster collaboration amongst Transportation Management Associations (TMAs), RTAs, municipalities, and regional employers. The Partnership believes the Demand Response Transit service model is dynamic and well suited for moderate-density suburban communities lacking access to, or with limited access to, traditional fixed-route transit and that current service should be expanded. By providing increased flexibility regarding destinations and commuting patterns, these services are available to the public at substantially more affordable rates than private Transportation Network Companies.
13	The largest rural transportation providers in the state are school bus operators. The unmet rural public transportation needs are so large that sharing of the resources used in school transportation needs to be fully explored, even though regulations make the sharing of school vehicles extraordinarily difficult. Drivers, dispatching systems, and maintenance facilities could be shared even if vehicles could not be.
14	As discussed at the RPAC meeting, the definition of "rural" used in the plan is unclear. The Executive Office of Economic Development (EED) has proposed a clarified definition of rural that should be used by all state agencies to ensure uniformity and to ensure that performance metrics evaluating progress are consistently applied. EED has defined rural as communities that have a population density of less than 500 people per square mile or have a population of less than 7,000. This totals 181 municipalities. The list of rural and small towns can be found here. Without a clear definition of rural, it would be easy to forget that many of these communities, especially the most rural, experience the same level of inequity and disinvestment as Gateway Cities. The Plan's focus on EJ areas in Gateway Cities is, again, important but not to the sacrifice of equally important needs throughout the Commonwealth. We recommend that a clear definition, preferably the same one that is used by the EED, be included in the Plan.
15	There is a great deal of focus on the MBTA, which is understandable. However, expansion of public transit, interconnection between transit authority boundaries and innovative microtransit solutions is a needed priority for the entire state. We recommend that where the Plan discusses the MBTA only, it acknowledge the needs of all RTAs.
16	There is little specific mention of the municipal responsibility to care for and maintain the local road network. The Ch.90 formula that is based on population, road miles and jobs has historically and continues to be unfair to rural municipalities. In Franklin County the average municipal Chapter 90 allocation is $229,000. The average per mile cost to repave a road is $340,000. The allocation prevents rural municipalities from pursuing TIP federally funded projects because they must prioritize their limited funding for road maintenance and from pursuing full-depth reconstruction of local roads, especially dirt and gravel roads because they do not have enough money for basic maintenance of the roads, bridges and culverts under their responsibility. We recommend that the Plan note that the Chapter 90 and other local road

Comment Number	Comment
	funding programs should be increased and reformulated to more equitably benefit rural areas throughout the Commonwealth.

1.23 Congestion and Travel Time Reliability

Thank you to all those who provided comments highlighting the importance of addressing congestion. MassDOT views congestion as a critical issue that affects the entire transportation system and acknowledges that, in line with research on the topic of congestion, widening roadways is not a sustainable solution. Ensuring that our transportation infrastructure not only serves private vehicles, but makes efficient, consistent, and predictable public transportation a uniform experience for the full range of modal choices on our road and railways is a key aspect of MassDOT's mission to serve residents of the Commonwealth.

MassDOT has identified reliability as a top priority throughout Beyond Mobility starting with the overarching reliability vision statement of "By 2050, people travelling by any mode or for any trip purpose in Massachusetts will be able to expect consistent travel times at any time of the day". MassDOT has also cited specific problem statements related to reliability including:

- Reliability Problem Statement 1: Massachusetts travelers by any mode experience congestion and travel delay, resulting in low confidence about the conditions they will encounter and diminished access to everyday needs.
- Reliability Problem Statement 2: Roadway congestion diminishes the reliability of public transit bus service, limiting its attractiveness and competitiveness.
- Reliability Problem Statement 3: Congestion and freight bottlenecks impact the efficient movement of goods, which drives up labor costs, lowers capital productivity, and often results in higher costs for households and businesses.

In order to address these reliability concerns, MassDOT has also created the following related Action Items:

- RAI1.1 Initiate projects flowing from prior planning studies and reports on travel time reliability; to ensure each unique opportunity for reliability improvements is studied and well-documented
- RAI1.4 Roadway bottlenecks and delay; to identify major roadway congestion and slow-down locations
- RAI1.9 Expand roadway asset management activities; to ensure transit and roadway asset conditions are documented and flagged for reliability improvement
- RAI2.1 Roadway investments for transit reliability; to reinforce the partnership between MassDOT, the MBTA, Municipalities, RTAs, and other transit providers in supporting projects which have the potential for roadway improvements related to reliability on our roadways across modes

- RAI2.3 Funding program for transit priority projects; to identify high priority projects which both increase the reliability of public transportation modes and reduce delays created by roadway congestion

- RAI3.2 Multimodal freight movement, to improve the experience of freight and other logistically important commercial goods moving into and though Massachusetts

MassDOT understands that there continues to be opportunities for reliability to be improved across the transportation network and we are committed to advancing projects and policies which facilitate this ongoing effort regardless of location, mode, or destination.

In response to comments received regarding coordination with rail-based freight transportation providers, the following Action Item has been added to the final Plan: RAI3.3 Coordination with Rail-Based Freight Providers. MassDOT's Rail and Transit Division will continue to coordinate with rail-based freight transportation providers that own railroads to improve collaboration with the goal of reducing the delay of passenger rail service that operates on freight lines,

Table 23 Comments on Congestion and Travel Time Reliability

Comment Number	Comment
1	As for the 93/95 interchange it is a nightmare and needs a major overhaul. This could include burying portions to allow for wider lanes or flyovers. To enhance driver safety and vehicle efficiency there are portions of our current highway infrastructure that would benefit from being buried. Examples include 495 between 93 interchange and exit 94, 495 between 93 interchange and exit 99A, 93 between 43B and 45. When heavy trucks are climbing the hill they impede the flow of traffic and when they are going down the hill they often reach speeds above 75mph. By providing a tunnel speeds will be maintained, fuel efficiency preserved and the land above the tunnel returned to nature. 495 in Lowell between the Lowell Connector and exit 91 needs to be widened to 4 lanes with one lane dedicated to exit 91. The three remaining lanes can continue to exit 92 and portions of this area can be buried. This interchange area is consistently backed up at all times of the day on both sides as drivers cannot manage the merge efficiently. Some of this widening can be done now with minimal bridgework by utilizing the breakdown lane. The Lowell Connector was planned to be extended into downtown Lowell in the 1960s however the project was tabled. With the amount of traffic congestion and the state of the buildings and neighborhood the extension was proposed to pass through this project should be reconsidered. However instead of having an above ground road network the extension should be underground with green space covering it.
2	I was thrilled to see "MassDOT does not believe in roadway expansion as a means to reduce congestion." I believe this is the right approach; the best way to reduce congestion is to facilitate a mode shift away from personal vehicles, and single-occupancy vehicles in particular.
3	Traffic mobility is poor in the AM hours eastbound on route 2 from Fitchburg, through the route 190 intersection and into the Lancaster area. In the PM hours the backup can start as early as Devens and continue westbound past the Leominster intersections. Planning for expanded lanes should be a priority for the next decade, plus.
4	Maintain high equipment uptime and ensure timely departure and arrival of scheduled trips.
5	Section 5.3, Reliability, should be expanded to include an action item which will direct the RTD to work with freight host railroads to improve collaboration. This can result in reducing the delay of passenger rail service which operate on freight lines.
6	Reliability was a major concern for the Partnership when creating our updated vision and priorities statements. The reliability, or lack thereof, of the transportation network across the Commonwealth and in the 495/MetroWest region acts as a deterrent for the use of public

Comment Number	Comment
	transportation options beyond single-occupancy vehicle commuting. The Beyond Mobility Plan reinforces this sentiment by stating that Massachusetts travelers by any mode experience congestion, resulting in low confidence about the conditions they will encounter and diminished access to everyday needs. The Partnership greatly appreciates the effort of MassDOT to prioritize locations within the roadway network that are prone to bottlenecks and delays. The Partnership's updated Roadway Vision and Priorities statement identified 10 major roadways of concern within our service area and three locations of concern outside of our service area. The prioritization of these areas will contribute to the improvement of reliability and safety throughout the Commonwealth. Improving the reliability and competitiveness of public transit was also of major concern to the Partnership when looking at improving RTA and Commuter Rail service.
7	MassDOT should prioritize improving the travel experience for all road users, particularly transit users and vulnerable road users. This involves improving reliability, access, and comfort. All services should arrive at their destination within 5 minutes of their scheduled arrival time. MassDOT should ensure that all transportation infrastructure, especially for active transportation, is in a good state of repair. Using public transit and active transportation infrastructure should be safe, seamless, and easy to understand. MassDOT should also seek to eliminate political barriers, such as travel between RTA service areas, and logistical obstacles, such as paying for different modes of transit/different transit services.
8	Maintain high equipment uptime and ensure timely departure and arrival of scheduled trips.

1.24 Green Gentrification

Thank you for the comment on implementing multimodal travel in a way that avoids green gentrification. MassDOT has a vision to ensure sustainability principles are applied on the ground in communities in an equitable manner. In Beyond Mobility specifically, Action Items DCAI2.1 (Funding Program for Multimodal Transit Connections), DCAI2.3 (Municipal Sidewalk Program), all make reference to the expansion of an interconnected multimodal network that serves all users in the Commonwealth. Through coordinating with municipalities on important local policy issues, MassDOT's focus on equity for all users ensures that green gentrification is not the outcome of green infrastructure.

Table 24 Comments on Green Gentrification

Comment Number	Comment
1	I really like the plan overall, including the process used to develop it, the structure and the translation of public input into priority areas and action items. I'm excited to see the emphasis on more and better multi-modal travel. My only comment is that the plan should acknowledge and address potential unintended consequences of transportation improvements that will flow from it. For example, there is growing evidence of "green gentrification" (see Alessandro Rigolon's work). Avoiding this problem requires recognizing potential for it, as well as other unintended consequences, and taking intentional action to prevent it from happening.

1.25 VMT and Mode Shift Targets

MassDOT believes in the criticality of mode shift with respect to meeting a host of goals not only for the quality and reliability of the transportation network, but for meeting the state's environmental and sustainability goals as well. Mode shift helps reduce vehicle miles travelled (VMT), which is

otherwise primarily driven by a reduction in overall trip-making. MassDOT's commitment to encouraging mode shift is demonstrated throughout the Beyond Mobility plan and referred to in several Vision and Values statements that define our six priority areas. Additionally, several Action Items defined under various priority areas encourage investment in and expansion of non-vehicular travel services and infrastructure, with the ultimate goal of promoting use of non-vehicular travel modes.

As the document establishing the strategic vision, values, and activities that MassDOT will undertake, those policies and processes that execute Beyond Mobility's directives will also be updated. These include MassDOT's framework for performance evaluation and target-setting, which is an ongoing and iterative process that culminates with the publication of the yearly MassDOT Tracker report. Chapter 6, Performance-Based Planning, introduces a number of measures that could be implemented to quantify progress on various Action Items.

Unlike MassDOT's system performance targets, those set by other agencies such as the Executive Office of Energy and Environmental Affairs (EEA) are regulatory in nature. Statewide greenhouse gas (GHG) reduction targets for transportation are established in the Massachusetts Climate and Clean Energy and Climate Plan (CECP) for 2025 and 2030 per 2021 law. MassDOT and EEA are strong partners in leading initiatives intended to meet these targets and will be responsive should further transportation-based emission regulations be enacted.

Table 25 Comments on VMT and Mode Shift

Comment Number	Comment
1	One of the most significant concerns is the absence of a target for reducing Vehicle Miles Traveled (VMT). Despite acknowledging elsewhere the importance of VMT reduction in mitigating transportation emissions and combating climate change, the plan fails to set a specific goal in this regard. Establishing a VMT reduction target is essential for ensuring our transportation system's sustainability and environmental impact.
2	Equally concerning is the limited connection the plan has with land-use policy. As we anticipate significant growth in population and housing by 2050, transportation planning must align with land-use policies to sustainably accommodate growth without increasing VMT. I am also significantly concerned about the absence of a target for reducing VMT. Despite acknowledging the importance of VMT reduction in mitigating transportation emissions and combating climate change, the plan fails to set a specific goal. Establishing a VMT reduction target is essential for ensuring our transportation system's sustainability and environmental impact. Likewise, I am concerned that the plan lacks a detailed commitment to Vision Zero. MassDOT must create a more comprehensive and effective plan by tying VMT reduction to safety metrics. Unfortunately, although electric vehicles will likely reduce greenhouse gas emissions from the sector, they are not a panacea for the number of road

Comment Number	Comment
	deaths every community in our state experiences every year.
3	I am concerned at the lack of straightforward statements that regional transit authorities like PVTA, MBTA, and GATRA need more funding to do what they do. Electrification and frequency are clearly two very important topics to meeting climate goals and increasing ridership and I am assuming they will be expensive.
4	This plan needs firm commitments to reduce VMT and commit to Vision Zero. There need to be objective measurements of progress with these initiatives, and clear steps for what will happen if progress is not made quickly enough. MassDOT should fully commit to public transit as the future of transportation, and stop investing so heavily in highway projects. Good first steps would be: Take parkway ownership from DCR and commit to long-term plans for fully removing cars from the parkways. Commit to and build the North-South rail link. The London Elizabeth line is enough evidence to show this would be a boon for the Massachusetts economy no matter the cost. Fully electrify the regional rail network with proven and affordable overhead catenary electrification. Stop wasting money on battery technology that is not capable of matching the performance, efficiency, and range of technology we've had for over 100 years. Commit to vision zero and leave no tolerance for unsafe conditions in any roadway. Road deaths are a choice, and MassDOT continues to choose vehicle speed over the safety of people.
5	Commit to a reduction in Vehicle Miles Traveled by private vehicles. More concrete language is required to ensure that these goals are actually pushed for and accomplished.
6	The general tone and gist of the vision statements is laudable, but the plan lacks clear targets for things like pedestrian and bicycle safety, mode share shift and reductions in vehicle miles travelled. The mass transit options are terribly lacking in Massachusetts and YOU should be setting specific targets for improvement.
7	The performance-based planning approach demonstrates a clear recognition of the importance of data, metrics, and timelines to track and measure progress—moving from qualitative metrics such as “decrease” and “increase” to quantifiable metrics (e.g., percentage metrics) would improve MassDOT’s ability to more effectively monitor progress and refine strategies to increase the chance of achieving the stated goal. In the near

Comment Number	Comment
	term, we urge you to consider establishing quantifiable metrics for priority climate and safety objectives, including VMT reduction targets for 2030 and 2050 that are aligned with climate action targets, and traffic-related fatalities reduction targets and related improvements that support Vision Zero by 2050.
8	MassDOT should establish VMT reduction targets of at least 25% by 2030 and 50% by 2050, aligned with climate action targets. Despite recognizing the importance of reducing Vehicle Miles Traveled (VMT) in other contexts (such as the McGrath Highway Reconstruction Project), MassDOT does not mention reducing VMT in Beyond Mobility. Other states have recognized that meeting ambitious climate goals will require a statewide shift away from cars. Washington State includes a goal of reducing VMT by 50% by 2050.4 California (25% by 2030 and 30% by 2045),5 Maine (10% reduction by 2025 and 20% by 2030),6 and Minnesota (20% reduction by 2050)7 all have percentage metrics for reducing VMT. Having fewer cars on the road in Massachusetts would also improve road safety and shorten traffic jams. It will also be a cost-saving measure for the Commonwealth in our roadway maintenance and repair budget. We urge MassDOT to add a clear and measurable VMT reduction goal – preferably one as ambitious as Washington's -- into future versions of Beyond Mobility. Additionally, we recommend that the state expand the existing Industrial Rail Access (IRAP) grant program, which has already significantly reduced the number of heavy trucks on our commonwealth's roads.
9	one glaring omission stands out to us: the lack of an ambitious and clear goal to reduce Vehicle Miles Traveled (VMT) in the state of Massachusetts. Despite acknowledging elsewhere the importance of VMT reduction in mitigating transportation emissions and combating climate change, the plan fails to set a specific and concrete goal in this regard. Establishing a VMT reduction target is essential for ensuring our transportation system's sustainability and environmental impact. In addition, there must be means of holding the agency accountable for achieving them. Without clear targets, measuring progress and ensuring the plan effectively addresses critical issues such as climate change, safety, and equity becomes challenging.
10	WalkMedford has repeatedly seen the lack of a specific goal for reduction in VMT manifest itself in projects from the Wellington Circle project to the recent proposal for the Main St. and South St. intersection. The lack of a clear goal for VMT reduction means that we are offered plans that lack real and transformative change towards a denser, more walkable city with a variety of true choices in transportation, because engineers are bound to plan for a projected increase in automobile traffic. We believe the goal should be to decrease this

Comment Number	Comment
	traffic -while building infrastructure that provides choices in transportation, from safer, more pleasant bus stops, to multimodal mobility lanes, and safe and pleasant sidewalks. We should build for the state, cities and towns we want - ones with a healthier, safer populace living in cleaner and quieter places. In conclusion, we urge MassDOT to revise Beyond Mobility to reflect a genuine commitment to sustainability, equity, and innovation in transportation. This commitment would include setting measurable goals for reducing VMT as well as enhancing safety, expanding public transit, and promoting equitable access to transportation options.
11	Furthermore, the plan lacks a detailed commitment to Vision Zero and mode shift, which is crucial to creating a safer and more sustainable transportation network. MassDOT can create a more comprehensive and effective plan by tying VMT reduction to metrics beyond greenhouse gas reduction, such as safety targets and cost-saving potential for road maintenance.
12	I appreciate how the plan is very upfront about the need to reduce vehicle miles traveled, both to reduce congestion and greenhouse gas emissions.
13	Though I think the intentions of the plan are good, they are not nearly explicit nor aggressive enough given the severity of our climate crisis. Unless we are transparent that Vehicles Miles Traveled must be reduced and by large quantities the steps towards climate goals and road safety are largely meaningless. This report should go further to identify roadways that can be narrowed, highways that can decommissioned, and ways that biking, walking and transit can become reliable alternatives to driving for more of the citizens of the commonwealth.
14	Electrify the public transit system, reduce VMT by at least 25% by 2030 and 50% by 2050, and better collaborate with partner agencies on land use and decarbonization.
15	There is only a single mention of VMT (Vehicle Miles Traveled) in the Executive Summary document, and it appears in an item devoted to studying the impact of congestion pricing. Without a firm, legally-binding, state-level commitment to REDUCING VMT, these plans are a sad joke. Reducing VMT MUST be a primary goal of a transportation plan for the year 2050. By that time, our coastline will have been inundated and we'll be dealing with massive storm surges, excessive rainfall, and extreme heat. The goal of Reducing VMT naturally leads to plans to expand transit infrastructure, expand cycling and walking infrastructure, and supporting widespread land-use and zoning changes to enable people to live closer to the amenities that make day to day living possible. A plan for 2050 that omits any commitment to sharply reducing VMT isn't worth the pixels it's printed with.

1.26 Vision Zero

Vision Zero is a key priority for MassDOT. In the Beyond Mobility plan, one of our values explicitly states, "MassDOT is committed to moving toward a future with zero roadway fatalities and serious injuries statewide in line with the Vision Zero initiative."

This commitment is also echoed within MassDOT's 2023 Strategic Highway Safety Plan (SHSP). The SHSP lays out a vision for zero roadway fatalities and serious injuries and the most impactful actions identified to date that can be taken to move towards zero deaths. These actions include speed management to realize safer speeds; addressing top-risk locations and populations; taking an active role in vehicle design, features, and use; and accelerating research and adoption of technology.

With respect to measuring progress toward Vision Zero goals, the Beyond Mobility plan contains several items. Action Item SAI2.1, "Back-casting toward Vision Zero," states that "In line with the 'back-casting' approach (identifying the actions closest to the achievement of a long-term target), MassDOT will define a series of actions working backwards from zero long-term fatalities and serious injuries on all roadways in Massachusetts and implement those activities. Among other initiatives, this will involve the continued data-driven implementation of systemic improvements and intersection safety interventions prioritizing areas with the highest crash rates with a focus on social and geographic equity." Additionally, Chapter 6 of the Plan (Performance-Based Planning) identifies several performance measures MassDOT's Office of Performance Management and Innovation (OPMI) will explore tracking as part of the development of MassDOT's annual performance management report, Tracker, to document progress toward reducing fatalities and serious injuries on our roadways. Many of these safety performance measures emphasize the need to track safety performance across demographic groups to acknowledge the disproportionately high number of crashes in Environmental Justice communities.

Table 26 Comments on Vision Zero

Comment Number	Comment
1	The plan lacks a detailed commitment to Vision Zero and mode shift, which is crucial to creating a safer and more sustainable transportation network. MassDOT can create a more comprehensive and effective plan by tying VMT reduction to metrics beyond greenhouse gas reduction, such as safety targets and cost-saving potential for road maintenance. Every year, over 350 people are killed on Massachusetts roads, thousands more injured and traumatized. There are 15,000 new cases of asthma from air pollution and 2800 deaths every year. We must do more for the health of our citizens. More access to walkability, bikeability and reliable transit both intercity and between cities is essential.
2	Likewise, I am concerned that the plan lacks a detailed commitment to Vision Zero. MassDOT must create a more comprehensive and effective plan by tying VMT reduction to safety metrics. Unfortunately, although electric vehicles will likely reduce greenhouse gas emissions from the sector, they are not a panacea for the number of road deaths every community in our state experiences every year.
3	Thank you for the opportunity to provide comments on the Draft Beyond Mobility Plan. While there are many needs and opportunities already covered in the Draft Plan, please consider these comments as the Plan moves forward: - Please provide emphasis on developing a safer transportation system that minimizes the risk of serious injury to motorized and vulnerable users of the system and the Commonwealth move towards its Vision Zero goals. Thankfully, many are developing Safe Streets for All

Comment Number	Comment
	(SS4A) Action Plans. The Safety Action Plans will allow for a systematic analysis and set of solutions to tackle the root causes of all crashes, with an emphasis on those involving non-motorists. The Action Plans will consider a range of low-cost, high-impact strategies that can be deployed. Completing the Action Plans will allow communities to be eligible for SS4A Implementation Grants to leverage federal funding to implement strategies. With the SS4A Regional Action Plan under development, communities can apply for demonstration grants.
4	The Melrose Pedestrian and Bicyclist Committee is writing to express our enthusiastic support for the vision and spirit of the Beyond Mobility draft plan. Our committee is particularly encouraged by the plan's emphasis on increasing funding for complete streets programs and providing technical assistance to help municipalities implement "Vision Zero" safety initiatives. The proposed use of Federal Carbon Reduction Program funds to bolster MassDOT's Complete Streets and Safe Routes to Schools Programs is a crucial step in creating more walkable, bikeable, and transit-friendly communities across the Commonwealth. Moreover, the creation of a dedicated funding program to prioritize non-vehicular modernization projects, especially in environmental justice communities and near transit stops, demonstrates a commendable commitment to equity and sustainability. These initiatives align perfectly with our committee's mission to promote safe, accessible, and enjoyable walking and biking in Melrose. We are also heartened by MassDOT's plans to provide targeted technical assistance to municipalities developing safety action plans aligned with "Vision Zero" policies. Fast-tracking this assistance in environmental justice communities and helping cities and towns access Federal grants for safety projects will undoubtedly save lives and make our streets more welcoming for pedestrians and cyclists of all ages and abilities. However, we would like to highlight a significant barrier that municipalities like Melrose face when it comes to implementing transportation improvements: limited technical capacity. Most municipal governments are stretched thin, and the complex work of developing and executing "Vision Zero" plans and complete streets projects often requires the expertise of a dedicated transportation planner. For many smaller cities and towns, funding a full-time transportation planning position is not feasible. As a result, the responsibility for these initiatives often falls on overburdened mayoral staff, Department of Public Works personnel, and Town Engineers who are juggling numerous competing priorities. To truly empower municipalities to take advantage of the funding and technical assistance opportunities outlined in the Beyond Mobility plan, we urge MassDOT to consider ways to help cities and towns build their in-house transportation planning capacity. This could include providing grants for municipalities to hire dedicated transportation planners, offering more robust technical training for existing municipal staff, or creating a shared regional transportation planning staff that can assist multiple communities. By addressing the technical capacity limitations faced by many municipalities, MassDOT can ensure that the visionary goals and programs set forth in the Beyond Mobility plan are achievable for communities of all sizes across the Commonwealth. Finally, we urge MassDOT to take this opportunity to commit to actionable ways to track and measure progress towards our shared goals. We as a state absolutely must act to reduce vehicle miles traveled, rapidly decarbonize our transportation sector, and eliminate fatal traffic injuries. We are concerned that the plan does not seem to set meaningful targets or benchmarks towards the visions expressed in the goals. We need to be well-beyond the planning stage at this point. It's time to make firm commitments towards our goals and do what it takes to achieve them. The Melrose Pedestrian and Bicyclist Committee, and other community groups throughout the commonwealth, stand ready to partner with MassDOT and the City of Melrose to implement the complete streets and "Vision Zero" initiatives outlined in the Beyond Mobility plan. We are excited about the potential to create safer, more vibrant streets that prioritize the needs of pedestrians and cyclists, and we believe that the plan's emphasis on equity and sustainability will lead to a healthier, more connected community for all.
5	Also commit to vision zero for 0 roadway deaths.
6	Needs accountability and achievable goals for vision zero
7	MassDOT should develop a detailed timeline and interim steps for achieving Vision Zero (0 deaths or serious injuries on all Massachusetts roadways) by 2050, including metrics for safety

Comment Number	Comment
	improvements and reductions in traffic-related fatalities. While Beyond Mobility sets a broad statewide safety goal for 2050, it does not provide specific plans or timelines for achieving Vision Zero — a future with zero transportation-related serious injuries or fatalities. 2021 saw a 40-year high of pedestrian deaths due to vehicular crashes nationwide, and 2022 saw a 41-year high—with Massachusetts seeing an increase of 21 deaths compared to 2021.8 While several regional planning authorities throughout Massachusetts are committed to Vision Zero (most notably the Boston MPO), these regional goals will be difficult to achieve without a broader statewide effort. We encourage MassDOT to pledge to implement systemic policy, enforcement, and infrastructure design changes and eliminate deaths and serious injuries on our roads, rails, and waterways.

1.27 Regional Rail and Electrification

Advancing regional rail is a key priority for MassDOT. One of the Beyond Mobility's values statements reads, "MassDOT is committed to the principle that a 'regional rail' system with expanded service throughout the day is critical to building a stronger and more inclusive state economy." Additionally, Action Item RAI1.6, "Regional Rail Services," states that, "The MBTA will continue to explore options to expand its regional rail services in response to changing travel patterns and behaviors, and be proactive in executing the recommendations codified in the Rail Vision report. Similarly, RTD will continue efforts to develop Compass Rail." Please see section 1.11 regarding expanded passenger rail for additional detail on changes made to the final Beyond Mobility plan in this area.

Table 27 Comments on Regional Rail and Electrification

Comment Number	Comment
1	I am concerned at the lack of straightforward statements that regional transit authorities like PVTA, MBTA, and GATRA need more funding to do what they do. Electrification and frequency are clearly two very important topics to meeting climate goals and increasing ridership and I am assuming they will be expensive.
2	This plan needs firm commitments to reduce VMT and commit to Vision Zero. There need to be objective measurements of progress with these initiatives, and clear steps for what will happen if progress is not made quickly enough. MassDOT should fully commit to public transit as the future of transportation, and stop investing so heavily in highway projects. Good first steps would be: Take parkway ownership from DCR and commit to long-term plans for fully removing cars from the parkways. Commit to and build the North-South rail link. The London Elizabeth line is enough evidence to show this would be a boon for the Massachusetts economy no matter the cost. Fully electrify the regional rail network with proven and affordable overhead catenary electrification. Stop wasting money on battery technology that is not capable of matching the performance, efficiency, and range of technology we've had for over 100 years. Commit to vision zero and leave no tolerance for unsafe conditions in any roadway. Road deaths are a choice, and MassDOT continues to choose vehicle speed over the safety of people.
3	There needs to be more emphasis on Regional Rail. The plan over relies on bus electrification to meet climate goals—this is short-sighted and discards mode-shift as a viable strategy. A comprehensive vision for bus transit within the MBTA or Regional Transit Authorities (RTAs)

Comment Number	Comment
	and a plan for expanding rapid transit capacity linked to highway capacity, bus utilization, and mode shift are missing. To meet the diverse needs of our communities, it is critical to prioritize a robust and integrated public transit network that stretches across the state from Florida to Falmouth.
4	The Partnership also included efforts to support clean transportation in our vision and priority statements. The Partnership supports prioritizing the electrification of the Framingham/Worcester line; given that this line connects the Commonwealth's two largest cities, it should not be left out of the first tier of electrification. The Partnership has also been supporting the RTAs in our region as they look to upgrade their fleets to more sustainable and fuel-efficient transportation options.
5	MassDOT should commit to Regional Rail and statewide rail connectivity; MassDOT should also commit to strategic rapid transit capacity expansion to enhance connectivity and mode shift. While we are pleased that Beyond Mobility explicitly mentions the Compass Rail project, we are disappointed that it does not articulate a more expansive vision for regional and intercity rail in Massachusetts. Continuing the state's pivot towards regional rail by pledging to provide frequent, electrified, all-day service on the commuter rail would put thousands of Massachusetts residents within range of frequent transit service for the first time. Electric trains would also be faster, quieter, and significantly more reliable than the diesel trains currently in service. Electrified Regional Rail has the potential to provide a feasible alternative to the car for millions of Massachusetts residents. MassDOT should also follow the lead of states like California, Minnesota, and Virginia by developing a robust- actionable, and fundable plan for statewide rail service to the Cape, the Northern Tier region, and the Housatonic River Valley. Strategic rail rapid transit expansions, which have the potential to improve system efficiency by freeing up buses and bus operators, should also be explored.

1.28 2025, 2030, and 2050 Climate Goals

MassDOT is eager to support opportunities where transportation investments can be leveraged to advance Massachusetts' climate goals and recognizes that many other agencies and stakeholders have established strategies to meet similar goals. Statewide greenhouse gas (GHG) reduction targets stemming from reductions in vehicle miles travelled (VMT) are established in the Massachusetts Climate and Clean Energy and Climate Plan (CECP) for 2025 and 2030, released by the Department of Energy and Environmental Affairs (EEA) in 2022, and MassDOT is continuously working with our partner agencies including EEA and the Governor's Office on progress towards meeting this goal.

In response to comments received during the public comment period for Beyond Mobility on this topic, several changes to the final document have been made, including but not limited to:

- Specific reference to the Global Warming Solutions Act (as amended by An Act Creating A Next-Generation Roadmap for Massachusetts Climate Policy) and acknowledgement of MassDOT's role in achieving the Commonwealth's goal of a Net Zero emissions limit for 2050.
- The target for reducing GHGs has been updated in Chapter 6 to reflect consistency with statewide goals.
- Several performance measures recommended to be established in this area have been moved from the section of "Measures MassDOT Will Explore Further" to "Measures Recommended for Inclusion in Tracker" (see Table 6.1: Measures Recommended for Inclusion in Tracker):

- Ozone precursor pollutants (e.g., particulate matter, nitrogen oxides, volatile organic compounds, etc.) and other emissions from transportation sources broken down by EJ vs. non-EJ communities
- Percent of absolute statewide GHG emissions attributed to transportation sources (in line with the statewide goal to achieve Net Zero by 2050)
- GHG avoided through electric charging station sessions
- Fuel-use avoided through electric charging station use
- Number of miles of shared paths, separated bike lanes, and bicycle-friendly streets
- Number of bicycle miles traveled
- Non-single-occupant-vehicle mode share
- Percent of rental housing units in transit overlay zoning districts, year-over-year
- Housing units per acre near transit stops

Table 28 Comments on Climate Goals

Comment Number	Comment
1	Supporting Clean Transportation and State Climate Goals: Electrify the MBTA Commuter Rail system with overhead catenary (not batteries), reduce VMT by at least 25% by 2030 and 50% by 2050, and better collaborate with partner agencies on land use and decarbonization.
2	I am concerned at the lack of straightforward statements that regional transit authorities like PVTA, MBTA, and GATRA need more funding to do what they do. Electrification and frequency are clearly two very important topics to meeting climate goals and increasing ridership and I am assuming they will be expensive.
3	Please make the goals here align with 2050 zero emissions.
4	Reducing Vehicle Miles Traveled ("VMT"), the CECP's other primary strategy for reducing transportation-sector emissions, and other essential strategies need clear metrics to be fully realized. "Decrease" and "increase" as "desirable metric[s]," as included in Beyond Mobility, are insufficient for leveraging funding and political will for action. Percentage metrics give agencies and legislatures a goal to cognize, whereas a general "decrease" is intangible and does not lend itself to political coalescence. These are not quantifiable metrics to guide planning, project development, maintenance, and operations decisions. If MassDOT adopts metrics now, it will be taking steps to prepare for the next Clean Energy & Climate Plan report, due January 1, 2028.3 MassDOT has an obligation to plan for this report, and the time is now. Later is too late. As the State progresses on EV infrastructure rollout, land use decisions are made that will foreclose the possibility of alternative uses, including bus lanes, bike lanes, and other non-automobile infrastructure. Adopting metrics now is also the most equitable outcome for EJ communities in Massachusetts. Low-income community members engaged in the stakeholder process for Beyond Mobility placed more importance on transit features on roadways than other groups. Beyond Mobility indicates that EJ communities suffer more crashes, and at greater rates of fatality, compared to non-EJ communities. Many folks responded to the stakeholder process, indicating that their mobility needs prohibit them from driving. Thus, they face significant barriers due to a lack of accessible, affordable, reliable transportation options. The robust Beyond Mobility stakeholder process elicited transportation needs of communities all around the State directly from said communities, yielding especially important information from EJ communities. People want options, safety, connectivity, and reliability. Setting metrics on our suggested goals is the best avenue for MassDOT to meet these needs and meet our climate targets.

Comment Number	Comment
5	In the initiative with the problem statement "Transportation is the largest contributor of Massachusetts' carbon emissions and transportation-related emissions are disproportionately concentrated in historically marginalized communities." further measures should be included, such as fine particulate matter from tire wear and brake dust, as well as measures for the chemicals and matter present in roadway surfaces and markings. Also, when touting the growth of electric vehicles in the United States, please showcase the rapid rise in e-bikes, which were comparable in scale to electric vehicle sales in 2021.
6	If possible, please consider installing solar panels on new construction. Renewable energy is a no-brainer unless there's incentive not to install it. It's time to start thinking long-term, and if that includes new protocols for new technology, so be it. Change is inevitable. If possible, please offer incentives for switching to electric vehicles. I own an older pickup (2005) and while it still works well, I would switch to an electric vehicle if they weren't financially out of reach.
7	Section 5.4, Supporting Clean Transportation, must be expanded to include hydrogen as a fuel for transit buses. Electric bus technologies do not meet all the needs for transit service providers, especially those in rural areas, and a number of RTAs have identified hydrogen powered buses as a preferred alternative. It is recommended that this section acknowledge this fact and that the appropriate problem statement be modified to include an action item for hydrogen as an acceptable fuel.
8	The action item related to Modernizing Power Infrastructure for the Purpose of Increasing Capacity to Accommodate Electrification (SCTAI2.4) is certainly applicable and necessary. In addition to coordination, it is imperative that improvements occur in advance of when they are needed. If these needed improvements are not in place at the time of need, significant problems will result. Additionally, necessary measures must be taken to ensure that these costs do not create additional financial burdens on residents.
9	Since we are talking about a 2050 planning timeline, is there a space for mobility improvements that are tied to Grid Modernization efforts? The identification and a discussion of the possibility of using electric or gas transmission corridors could be useful in planning for our 2050 mobility needs. Identifying these existing rights of ways would be of value in future planning efforts.
10	I really support the priority areas: 1. Safety 2. Destination Connectivity 3. Travel Experience 4. Reliability 5. Supporting Clean Transportation 6. Resiliency I would just add that we really emphasize a transition away from car first design. I appreciate supporting "clean transportation" but for me, it's more about who we prioritize. I hope that we prioritize people first, then cars. This speaks to all priority areas.

1.29 Expanded Rail Trail Network

Thank you to all those who provided comments highlighting the importance of extending the trails network. MassDOT views trails as central to improving the quality of life for residents and reducing GHG emissions. In Beyond Mobility specifically, Action Items DCAI2.2 (Shared Use Path Program and MassTrails Grant), TEAI4.2 (Inventory of active transportation amenities), all make reference to the importance of supporting existing and new trails in the Commonwealth. MassDOT has many trails projects funded and anticipated which will add to the trail network.

Table 29 Comments on Expanded Rail Train Network

Comment Number	Comment
1	Please connect and expand the rail trail network. I live in Maynard, MA and use the Assabet River rail trail all the time on my e-bike to run errands and get to the commuter rail. I'll bike to my office in Boston over 25 miles away using Route 62 for 10 miles through Concord to the Bedford depot where the Minuteman rail trail starts. Then it's 15+ miles on the rail trail to Alewife in Cambridge, then the Somerville Community Path Extension into Boston. If the Minuteman were extended to West Concord's Bruce Freeman rail trail and the Assabet were connected (via commuter rail Fitchburg line right of way), I'd have 25+ miles car free trail to commute. This would greatly reduce the stress of riding and allow many people to get around without fear of getting hit by a car or deal with the horrendous traffic. I encourage MassDOT to implement this type of connection across the state. I know that there is rail trail planned to go across the whole state and this is a great start. Please continue connecting trails and the bike network. It's a great car alternative and a very fun way to get around (even in winter) and allows people ages 8-80+ to get around safely and comfortably.

1.30 Bus Lane Enforcement

Thank you to all those who provided comments highlighting the importance of bus lane enforcement. MassDOT sees our independent bus lanes as a vital part of our public transportation network and we are committed to ensuring they are both well positioned to help reduce congestion and unobstructed by private or commercial vehicles. In Beyond Mobility this is specifically addressed in Action Item RAI2.2 (Enforcement of Traffic Violations), in which MassDOT and the MBTA will coordinate with municipalities and other state agencies, including the State Police, to facilitate stricter enforcement of traffic violations involving transit priority infrastructure. This action item also describes MassDOT's commitment to creating a statewide authority for the automated enforcement of bus stops and bus lanes. Additionally, MassDOT has identified the number of bus lane citations as a key metric which will continue to be explored and developed in the future. MassDOT will continue to prioritize measures which expand the effectiveness of this transit priority infrastructure as a key component of our public transportation system.

Table 30 Comments on Bus Lane Enforcement

Comment Number	Comment
1	In SAI2.6 Automated enforcement pilots, it is critical to include the usage of automated enforcement for transit vehicles in recommendations and plans for the Commonwealth. Transit improvements that benefit marginalized groups are not effective without enforcement. The Boston region has seen the effectiveness of its bus lanes neutered by parked cars or drivers who don't care. This exacerbates equity issues for transit users who you know are often marginalized. Many regions, including New York City, have used automated bus lane enforcement incredibly effectively with a focus on equity. For the Commonwealth to reach its environmental and equity goals, transit vehicles must be included in the language for automated enforcement.
2	Your plan, however well-intentioned, seems to beat around the bush constantly and tries to avoid even the slightest suggestion that a single person may be inconvenienced or required to change their behavior. For example, in the safety section you have this bullet under action items: "2.6 Pilot automated enforcement technologies for running red lights and speeding, and develop recommendations for the Massachusetts Legislature's approval." So you're telling me your 25 year goal is to pilot automated enforcement and make

Comment Number	Comment
	recommendations? This is laughable. This technology has been successfully deployed around the globe. It needs neither study, nor piloting, nor developing recommendations, it just needs implementation.

1.31 State of Good Repair (Roadways)

Thank you to all those who provided comments highlighting the importance of improving and maintaining the state of good repair on Massachusetts' roadways. MassDOT is committed to ensuring that all roadways, roadway markings, and other roadway assets are of the highest quality to allow Massachusetts residents to safely and efficiently travel throughout the state.

In order to demonstrate MassDOT's goals around roadway state of good repair and high quality roadway assets, the following Beyond Mobility Action Items articulate important actions in this area:

- RAI1.8 Pavement and bridge reliability improvements. MassDOT's Highway Division will continue to address state of good repair issues that affect reliability along roadways according to MassDOT TAMP recommendations
- RAI1.9 Expand roadway asset management activities. MassDOT will develop a plan for expanding asset management activities to include additional assets, including the condition of sidewalks and bicycle facilities as well as safety treatments to improve reliability.

MassDOT is also committed to ensuring the long term resiliency of these roadway assets, demonstrated by the following action items:

- RSAI1.11 Implement the Highway Resiliency Improvement Plan; This will ensure MassDOT and other agencies overseeing roadway conditions are able to strategically plan roadway maintenance work, especially that being necessitated by extreme weather events
- RSA1.13 Resilience improvement prioritization. Screen and prioritize resilience improvements to vulnerable roadway/bridge assets utilizing information from the MassDOT Resiliency Improvement Plan evaluation, CAVA, MaPIT, and similar sources. Coordinate with other agencies and engage stakeholders, as applicable, through the project development process. Ensure transparency to communities on the process.

Table 31 Comments on State of Good Repair (Roadways)

Comment Number	Comment
1	Have any of you folks travelled on the MA Turnpike lately. Last week I attended a funeral in Springfield, I live in Kingston MA. I trek over to Rte 495 to gain acess to the MA Turnpike. I was appalled by the state of that highway. As a citizen of MA for my whole life, I was shocked and saddened by the state of that highway. The potholes are not only numerous, they are huge. That road has made plenty of money and is still making money. Please tell me and the public why the MA Pike is not being reinvested. It is quite a challenge to drive trying to avoid those large holes.

Comment Number	Comment
2	Maintaining state owned roads. Some are in horrible shape. North end blvd salisbury ma. Drains don't work. 253 n.end boulevard
3	Roads need to be repaired on a much more regular basis. It is to the point that potholes are causing people to swerve around them to avoid damaging their vehicle, causing unsafe driving practices. I don't know why roads aren't repaired more frequently, but where things are isn't nearly sufficient. I drive daily which makes this a high priority to me. Alongside regular road repair we need those repairs to be reliable after being done. Far too many times have I seen a pothole filled, only for the new asphalt to sink into the former hole, making a new, slightly smaller pothole that requires a second repair. Its just as easy to do it right the first time as it is to get it wrong, the difference being a desire/incentive to follow best practices. I do understand that the winters here cause road damage, but I do not understand why that damage goes unaddressed for years at a time before finally being patched insufficiently. Extremely frustrating.
4	Urgent attention is needed for line painting on all roads, with particular emphasis on essential routes such as 95 and 495. Painting activities, especially on highways like the Pike, should avoid scheduling during Sunday nights in the summer to minimize disruptions. Concerns regarding the use of SuperPave technology, which may contribute to unstable slopes and flooding issues, warrant examination and proactive solutions to mitigate adverse impacts. Concerns regarding the use of SuperPave technology, which may contribute to unstable slopes and flooding issues, warrant examination and proactive solutions to mitigate adverse impacts. Strategic investments in paving major corridors that have not undergone resurfacing for extended periods are crucial for maintaining infrastructure integrity.

1.32 Transportation Finance

The Transportation Funding Task Force (TFTF) will be meeting monthly throughout 2024 and will develop recommendations surrounding funding for the next generation of transportation investments in the Commonwealth.

With respect to comments regarding cost increases on projects, MassDOT acknowledges that recent project cost increases have been higher than normal. We will be coordinating with Federal partners in the coming months on assumptions for year of expenditure (YOE)/inflation adjustments as part of project budgets. With respect to amendments to the Statewide Long Range Transportation Plan, MassDOT's Public Participation Plan (PPP) includes procedures that dictate any changes. The document is able to be amended in the event of an update to the Grant Anticipation Notes (GANs) repayment schedule change.

MassDOT also recognizes that capacity and resource constraints limit the ability of some of our partners like municipalities to apply for and use various funding opportunities like discretionary grants. As stated in TEAI2.2, MassDOT is committed to helping smaller organizations and entities apply for these sources of funds, with respect to Complete Streets initiatives and beyond.

Table 32 Comments on Transportation Finance

Comment Number	Comment
1	The State must make public transportation safe, reliable and affordable. A gasoline (not diesel) tax is the best way to subsidize public transportation so it can run 24/7. Sometimes, it is that easy.
2	Chapter 7 of Beyond Mobility discusses the increased investments that are projected to be made through 2050. Beyond Mobility does not address the exponential increase that has recently been experienced with project implementation across the Commonwealth. Projects cost estimates included in regional Transportation Improvement Programs (TIP) have doubled in cost between the 75% and 100% design submittals. While MassDOT is proposing to invest significantly more money in the regional transportation system, increases in the actual cost of construction may minimize the overall benefits. This is addressed somewhat at the top of page 144, but could be reinforced by including information on how historic project costs have increased over time. The discussion in Chapter 7 on Grant Anticipation Notes (GANs) repayment assumes no repayment from 2027 – 2031 and very modest repayments from 2023 – 2044 (Page150 Table 7.1). This is unrealistic based on historic trends. Chapter 7 should include scenarios on potential GANs repayment schedules that may have been considered or could be required based on future need. Information should also be included on how Beyond Mobility will be amended if in fact a GANs repayment is required prior to the next update to the Commonwealth's Long Range Transportation Plan.
3	It is imperative for the Department of Transportation (DOT) to prioritize responsible fiscal management in serving the public interest. Advocacy for legislation empowering DOT to impose property liens on violators and adjustments to unit pricing to attract high-quality contractors should be pursued.
4	The section on projected revenue, Section 7.4 Funding Forecast for Beyond Mobility, is absent from any discussion or assessment of whether these projections are adequate to meet future needs. The annual percentage increases are very low and may not keep pace with inflation. The long-range plan should contain an estimate of future needs and any potential shortfalls should be acknowledged. This information could help inform current and future discussions on transportation funding needs.
5	Could there be a discussion of The Fair Share Amendment ("Millionaires' Tax") in the funding section? Perhaps some data on what funds have been allocated to mobility efforts so far and what the projections may be for the future? Many of us worked to promote passage of this hoping to see more funding for mobility needs.
6	Also in the funding section, it would be nice to see something about helping under-resourced communities and areas access funds. All too often grant funds end up being accessed by the more affluent communities who have the staffing and resources to research and apply for grants. How can the Commonwealth help the under-resourced areas better access any public or private funds that can help move mobility planning efforts forward.
7	The report should consider action items utilizing transportation providers that receive little or no DOT funding.
8	We are grateful that Beyond Mobility acknowledges that "Financial and Staffing Resources" are a significant obstacle to properly addressing all six priority areas. We are concerned that the draft version of this report does not properly estimate the impact that is expected from the transition to electric vehicles and the goals set in the Commonwealth's Clean Energy and Climate Plan. The Commonwealth is facing a transportation funding crisis both in the near-term and long-term at the MBTA and in the statewide road and bridge program. The transition to electric vehicles and the decline in gas tax revenue will accelerate this gap and require the Commonwealth to find new ways to support current transportation programs. Beyond Mobility could help raise public awareness about this critical issue by calculating the projected funding gaps at MassDOT over the next twenty years under current revenue projections. This information would improve the final version of this report, help inform the Governor's Transportation Funding Task Force, and ultimately lead to solutions that can deliver many of our shared policy goals.
9	We must shift the proportion of spending to public and active transportation modes and away from highway modes,

Comment Number	Comment
10	From a rider perspective, bus could mean MBTA/RTA fixed route, employer/housing development/community-operated fixed route or many-to-one shuttle, and/or RTA/municipal curb to curb microtransit. If you combine the prioritization of bus and shuttle services, combined points for investment are exceptionally high, especially for low-income and disabled riders.
11	Page 61, discussion of financial resources for Rail and Transit mentions shortfalls for rail services, without reference to the bus, shuttle and microtransit network that covers significantly more ground in the state and also face challenges with fiscal sustainability. Please insert the following text in brackets: "However, during the development of Beyond Mobility, MassDOT staff have reported particularly insufficient Federal and State funding for rail and transit needs, which leads to funding shortfalls in areas required to maintain a consistent level of service on passenger and freight railways [as well as bus and microtransit coverage] in the state."
12	Chapter 7 misses funding that is used for transportation in MA but not currently administered by MassDOT. The Human Services Transportation office at EOHHS receives significant federal and state funds to operate non-emergency medical rides for large segments of the population. This is important enough to highlight with a bullet on page 141. On page 143, a nod to municipal spending takes up less than 2 full lines of text. In terms of the resident experience, locally financed transportation projects and services heavily impact day-to-day living and property taxes/rent. Quantifying how much municipalities spend on transportation would be helpful here as matter of scale.
13	On page 143, the editors summarize that, "Over time, the Commonwealth's transportation budget has grown steadily to keep pace with resource needs for existing transportation infrastructure and to secure funding for new projects." This sentence is in direct conflict with frequent headlines about MBTA disinvestment, and the "lack of ongoing and sustained funding" for microtransit described on page 111.

1.33 Improved Public Transit Amenities (Including Improved Cell Service) and Fare and Schedule Coordination

Thank you to those who provided comments related to the improvement of public transportation amenities across the Commonwealth. MassDOT understands that the provision of high quality services and amenities, whether they facilitate multimodal travel on our roadways or provide enhanced comfort for public transit riders, are critical to the effectiveness and competitiveness of our transportation options and we are committed to continuing to improve these assets in the future.

In order to address public transit amenity quality improvements as they relate to the full range of transportation modes and services MassDOT, and its partner agencies, offer; the following Action Items have been developed:

- SAI3.1 Sidewalk and bicycle facility gaps; to ensure all gaps in our active transportation network are prioritized for connection and that users of this infrastructure are safe throughout their journey
- SAI4.4 Station and vehicle safety improvements; to ensure all MBTA and RTA public transportation stations and vehicles are accessible, safe, adequately lit, clean, and otherwise in working order

- DCAI4.2 Coordinating bus transit improvements with RTA providers; to explore opportunities for targeted improvements addressing reliability, frequency, coverage, and on-time performance of MBTA and RTA public transit services
- TEAI1.3 Capital enhancements for transit station access improvements; to identify bus stops and other transit system access points and customer service amenities which require improvements including increased comfort and safety of these facilities

Table 33 Comments on Improved Public Transit Amenities (Including Improved Cell Service) and Fare and Schedule Coordination

Comment Number	Comment
1	Improve overall infrastructure and the quality of public amenities, especially for public transit riders, pedestrians, and cyclists, while eliminating barriers to transit like fare and schedule coordination.
2	PLEASE FIX THE PUBLIC TRANSIT SYSTEM. I WOULD LOVE TO USE THE T EVERY DAY IF IT ACTUALLY WORKED. (THERE'S ALSO SOME REALLY LOW BALL FIXES THAT WOULD MAKE A DIFFERENCE SUCH AS NEW (AND CLEAN) SUBWAY CARS THAT DON'T SCREECH UNTIL YOU'VE LOST YOUR HEARING, OR PROVIDING CELL-PHONE CONNECTIVITY THROUGHOUT).

1.34 Paratransit Services and Vendor Consistency and Retention

MassDOT acknowledges the concerns surrounding paratransit among paratransit riders and caregivers. Ensuring that people of all abilities are able to travel freely and unencumbered throughout the Commonwealth is a top priority for MassDOT and is a critical step towards creating a more equitable transportation system. As stated in Travel Experience Problem Statement 3, MassDOT is also aware that "transit riders and people with disabilities find it difficult to navigate the transit options available to them", and often do not have these fixed route transit services available outside of urban areas. MassDOT is therefore committed to ensure that paratransit is not only available, but affordable, reliable, and efficient across all regions of Massachusetts.

In response, MassDOT has expanded Travel Experience Problem Statement 1 and added an additional Paratransit-Related Action Item (TEAI1.4): “Develop more robust collaboration efforts between all agencies involved in providing human services transportation, including seniors, paratransit, and non-emergency medical and social service needs. MassDOT's Rail and Transit Division will look to further develop its partnership and collaboration with other agencies that support these services, particularly the Executive Office of Health and Human Services' Human Service Transportation Office, the Department of Developmental Services, the Massachusetts Rehabilitation Commission, the Massachusetts Commission for the Blind, the Department of Mental Health, Councils on Aging, the MBTA, RTAs, and other identified agencies and their relevant departments and offices.

Table 34 Comments on Paratransit Services and Vendor Consistency and Retention

Comment Number	Comment
1	My daughter, who has profound autism, recently turned 22. The next day she left the comfort and safety of her 17 year undergraduate program and van ride/driver. Finding transportation to her adult program was very stressful. Due to the nature of her disability, she rides over an hour to a specialized program. She has done this since she was 6. Over those years I worked with the van company to ensure she had a reliable, safe, and tolerant driver (as her behavior is challenging at times). Over those many years, she had only 3 drivers who very much forged a connection with her. I cannot tell you how much consistency and the correct matching of driver/student matters on these long rides. They are travelling on multiple busy highways with a lot of traffic and a driver who is comfortable with my daughter and understands my daughter is incredibly important for both of their safety. My daughter has very limited communication. She could never tell me if something inappropriate happened to her. Having the appropriate driver is almost as important as the program she is travelling to. Getting her to that program in a good frame of mind is essential and the driver plays a big part of that. My daughter is extremely complex and knowing her idiosyncrasies is key. Consistency is key, rotating drivers do not work and produce high anxiety and behavior. My daughter's behavior often is escalated by the emotions of others so calm is key. That is often hard to find in a driver driving a very stressful and long route. This all being said, the reason finding suitable adult transportation was difficult is because of the work force shortage and no routes/drivers being available. There is not an abundance of MART vendors in my area that are equipped to run a "school/program" route. Consumers/parents are also not allowed to be part of the MART/vendor process. I had to seek out help from many people to allow my daughter's undergraduate driver to quit her current job and join a MART vendor to continue to drive my daughter. This woman is an angel but I know other driver's who drive severely disabled students who have expressed that they would do the same! I think this is something that should be considered and allowed! Possibly even offered as the process to get this done for us was in no way easy! My driver also had to give up some benefits going from driving under a school contract as opposed to MART. For instance, school contracts are more lucrative and she drove a brand new mini van. She now drives a van with 200k+ miles that has broken down 3 times. I have heard from her company that they would consider getting her a newer van if they felt secure that the contract would be renewed/consistent! This would be safe and beneficial for everyone involved. Now, as MART contracts are up for renewal we find ourselves in the same anxious spot. We, as the parents of special needs young adults, received the EOHHS/Changes in HST Route letter of May 22nd with dread! Many of us love our drivers and have worked hard to find/keep them. Many of them are such an important part of the daily lives of our children. This is not just a random ride to an appointment. It is day in and day out on very long drives in very busy traffic routes. I am panicking if our vendor (and driver who quit her job for us!) is not picked up! I understand transportation is vast and challenging but I think this piece of the transportation puzzle (disabled/DDS program recipients) is often overlooked and not considered. Consistency is key. Parent, guardian, and consumer input is key (maybe a choice/survey before renewals or changes are considered!) Keeping something that is working for everyone in tact is immensely important! I am praying my daughter's vendor and driver are renewed, I have no idea what we will do if they are not. Thank you for you time in listening to my feedback.
2	I would like on demand transportation that would take me (I am in a wheelchair) where I want to go, to see friends and family. I want to be able to pay a small amount like bus fare ($2.00).
3	There needs to be safe, reliable, timely transportation for those with intellectual disabilities.
4	I would like to see Milford have handicapped accessible public transportation on demand. I would like to pay the same as bus fare for that service. right now I can't go to as many places as I would like to, like the movies, restaurants, dates with my girlfriend, and other things.
5	Please note currently my daughter commutes from her apartment in Hyannis to her Community Based Day Program in Sandwich, she relies on CCRTA's Dart service. This ride is 16 miles, however in the morning, it takes about an hour. But that does not include the 30 minute wait time that she often has before the scheduled DART bus arrives at her apartment. Her return ride at 2 PM often takes 2 hours to return her to Hyannis. That is just not acceptable. Whatever plans you have in place need to ensure that the young adult disabled population needs to have better transportation options available to them that are more convenient, take less time, and are not cost prohibitive.
6	I have cut and paste and email I sent this morning to our State Senator & State Rep, Our DDS Area Director, our former area director who had a passion for transportation, and a couple of people on a non-emergency HST transportation committee. None of the links that I embedded

Comment Number	Comment
	in the original email are active. If you would like me to forward you a copy of the email with active links, please email me at [redacted]. Jillian qualifies for ADA Paratransit transportation. We have sat on Regional Coordinating Council meetings, and Board of selectman meetings advocating for better transportation options. Our advocacy got a bus stop added to Westminster, but our home did not fall within the three quarter mile buffer zone, so Jillian did not qualify for rides. When asking the Councils on Aging (COA) for non-medical transportation, families are told things like "we don't do that", "that's not what we do", "you're not in the buffer zone, so you don't qualify", some COAs say; "she's only 34?, we only transport senior citizens", "if we receive a request for a medical transport Jillian will get bumped, and you'll have to find another ride", the list goes on... (Westminster was the most supportive COA. They provided 4 rides per week when we lived in Westminster. In Ashburnham Jillian sometimes got one COA ride per week, and in Winchendon Jillian has no COA rides) The Human Service Transportation (HST) line item for DDS is just under $25million dollars to provide segregated transportation to dayhabs and work programs. The way HST is set up, it does not work for people who want to self-direct their services in rural areas of the state. MART provides this "brokerage" transportation in some large areas of the state. However, MART does not provide this service in many of the cities and towns in North Central MA (as seen on this map from their website). It is unclear why... Jillian is on the Federal Home & Community Based Service waiver (HCBS waiver 1115. Specifically, the Community Living Supports Waiver, which brings federal dollars into the state via the Commonwealth's General Fund). It is my understanding that legislators are tasked with deciding how these funds are spent. Here is a link to the HCBS Waiver handbook that lists the services covered (transportation is included). We are not sure how to access waiver funds to cover Jillian's additional transportation costs. Since 2011, when we started self-directing Jillian's supports & services, the agency we worked with suggested that we pay $15.00 per ride from her DDS budget to get Jillian into the community to work, volunteer, and participate in a meaningful life. At that time, Jillian also received 6 hours of skills training per week. Last year, we decided that with the cost of everything (i.e.; insurance, gas, oil, car payments, maintenance, etc...) going up and in order to keep people who are willing to provide rides, we increased to $20.00 per ride. Think about how many times you get in and out of your car during the day, and how many rides you would have to pay for if you could not drive. What would that look like, and how much would it cost? On average we pay for 40 rides per month (around $800) that are reimbursed by her DDS Agency with Choice budget (by taking money away from her ten hours per week of skills training funds). For reference, typical Day programs are 30 hours - plus transportation, Jill only gets 10 ten hours - and that's only when there is staff available. Transportation money is taken away from Jillian's skills trainer line items in order to pay for transportation. If Jillian's transportation were included on her Plan of Care, I believe her rides could be paid for from waiver funds, not her DDS budget that pays for skills training for independent living skills, fitness and tutoring. Human Service Transportation is segregated transportation, that costs the state way more than $20.00 per ride. Jillian's 2023-24 Budget included funds for 10 hours of skills trainer support per week. However, due to the lack of staff available, Jillian only had three hours per week staffing available to her from July 1, 2023 through the end of November, 2023. Although this allowed shifting of funds to cover some of Jillian's additional transportation costs (which are less than $10K for the fiscal year), it left seven support hours per week unstaffed, and the bulk of unpaid skill building to the caregiver (me), while trying to work 30 hours per week to make ends meet. On February 8, 2024 we received an email from DDS sharing that MART would be offering

Comment Number	Comment
	"FREE" Saturday inter-city ridership through the end on the fiscal year. This is of no use to Jillian. Jillian currently needs transportation to/from Leominster on weekdays, not Saturdays. I'd be interested in seeing what this MART ridership data looks like. I'd also be interested in knowing what, if any, money MART receives from the state to offer this free service. The Real Lives law should provide an opportunity for a great person centered, self-determined meaningful and inclusive life in the community to all persons found eligible for DDS... Systems do not like change, but without change there is no room for growth and systems improvement. The DDS self-determined self-direction models have very little chance to grow if the burden of transportation in rural communities remains on families. I asked that transportation be included on the agenda of our recent DDS Citizen's Advisory Board meeting on May 23rd. At this meeting I talked about the recent CHNA9 Future of Mobility in North Central MA meeting that Jillian and I attended on May 7th. At this May 7th meeting a representative from Mass-DOT spoke about Beyond Mobility 2050. Jillian and I were the only people who talked about transportation hurdles that are experienced by people who have disabilities who can not drive. So many people are not aware of meetings like this, and they don't have time to find out because they are providing transportation for their loved one, or trying to find them rides. I will share this feedback with Beyond Mobility 2050. Please let us know if there is anything that Senator Comerford's office can do to help increase affordable on-demand transportation options for families like ours in North Central MA. I found this picture posted on FaceBook by another Massachusetts parent which pretty much says it all: "I'd like to hang out but I can't... My kid is lining their #BESTLIFE & I am their ride" I'm not sure who else I should share this information with, but I have copied our DDS Area Director (Sharon Brown) and our past Area Director and now Acting Assistant Commissioner at DDS (Michelle Harris - transportation was one of her passions when she was in the Fitchburg office). Also, I found this webpage and have copied Leo Sarkissian, Executive Director of the Arc of Mass, and Sharna Small Borsellino from the Non-emergency Human Service transportation talk-force list Thank you so much for listening. Any support/guidance any of you can provide will be greatly appreciated! Kind regards, ðŸŒ·~Ann & Jillian
7	Our children with disabilities need to have more options. They cannot drive and their self direction services are very limited to where they can go. Mass HTS model need to consider the limits it is putting on people with disabilities. They need on-demand transportation that is reliable to live and engage in their community. There needs to be more options than just transportation to the traditional day programs and doctor's visit. What about transportation to go shopping, to the cinemas, to restaurants, meet up with friends and family at important events. More options will give them more independence and determination to be within their community.
8	I would like to see if transportation could be cheaper like using Uber or Lyft: on demand transportation for people with disabilities. It is not fair how they have to wait and sometimes rides are not available so epopel miss out on seeing family, friends, evenst. Transportation should be spread out like Uber and Lyft, that can go everywhere. Thank you!

1.35 Public Information Communications and Driver Education

Thank you to all those who provided comments relating to public awareness, communication, and education regarding work zone safety and driver behavior. Providing clear public messaging around

the importance of safe travel through work zones and mindfulness when traversing areas monitored by MassDOT Highway Division staff is crucial not only for the well-being of these staff members, but also for the prevention of safety incidents at these possible conflict points.

MassDOT is committed to improving safety on our roadways for both MassDOT staff working on roadway infrastructure projects and for the general public travelling though these work-zones, as articulated in the following Action Items:

- SAI2.3 Systematically invest in and deploy low-cost interventions with proven safety benefits; this can be applied in the case of driver education and clear signage to alert drivers of work taking place and to provide clearly visible markers defining areas where drivers should proceed with caution
- SAI2.6 Automated enforcement pilots; these automated enforcement mechanisms can be deployed within work zones to provide a means of simple and consistent enforcement of temporary speed limits designed to protect MassDOT highway workers
- SAI5.2 Driver education content; which can be deployed to provide public educational content ensuring residents are aware of proper safety precautions when navigating work zones
- SAI5.4 Education resources for new drivers; which can be catered to ensure that new drivers are educated about the possible dangers of unsafe driving behavior such as speeding and are aware of high-crash-potential areas such as active highway work zones

In addition to these Action Items, MassDOT will continue to work with stakeholders and the public to ensure that project timelines and opportunities for engagement around emerging safety concerns are clearly articulated and appropriately publicized in the future. We understand that this is an iterative process and will continue to support roadway safety initiatives that protect both the public and highway workers alike.

Table 35 Comments on Public Information Communications and Driver Education

Comment Number	Comment
1	An ongoing public awareness campaign should educate motorists about the importance of yielding to DOT vehicles and personnel on highways, with corresponding legal measures to deter endangerment of employees. Improved communication strategies, inspired by successful models such as those in Maine and New Hampshire, are necessary to convey vital information to motorists effectively. Enhancing communication between project management and residents is essential. Robust project controls should be implemented to regulate traffic, prevent speeding, and minimize disturbances to residential areas during non-working hours.

1.36 Travel Experience

Thank you to all those who provided comments encouraging MassDOT to improve the travel experience for users. MassDOT views an optimal travel experience as a priority for the future. In Beyond Mobility specifically, Action Items TEAI1.3 (Capital enhancements for transit station access improvements), TEAI2.1 (Data layers), TEAI3.1 (Station and vehicle improvements), TEAI3.2 (Signage and customer information), all make reference to an enhanced travel experience in the

Commonwealth. MassDOT will be ensuring that each improvement benefits users and enhances the travel experience for all.

With respect to comments received on rest areas, Action Item TEAI5.3 Improvements to MassDOT Highway Service Centers and Rest Areas, notes that MassDOT's Highway Division will identify and implement improvements for highway service centers and rest areas under its jurisdiction.

Table 36 Comments on Travel Experience

Comment Number	Comment
1	Reliability: Maintain a high equipment uptime and ensure timely departure and arrival of scheduled transit trips.
2	Improve overall infrastructure and the quality of public amenities, especially for public transit riders, pedestrians, and cyclists, while eliminating barriers to transit like fare and schedule coordination.
3	The Green line and other transit is still so slow. So many daily signaling issues and no new trains. Can we fix these issues quickly? Why do all the trains need to be made in Mass? Please repeal this law as it limits the options. Millions of riders suffer from these old trains because of these antiquated laws.
4	Fuel pump layouts at travel plazas should prioritize safety, with pumps positioned perpendicular to traffic flow. Moreover, measures should be taken to ensure fair pricing at these facilities. Persistent closures of rest areas, particularly along critical routes like I-95, I-495, and I-195 East/West, must cease. Essential amenities such as functional restrooms, adequate parking for larger vehicles, and fuel services should be maintained to meet travelers' basic needs.
5	When I use the bus I use the front door for going out too because they are supposed to kneel the bus. I have bad knees and they don't always kneel it for me. Friday they do fewer busses and that is NOT good. The busses are over full. Sometimes the driver leaves the hub and won't take any more riders even when the bus is not overfull. When you wait at City Hall ir at other stops it is like you are being penalized for not walking to the bus station and getting a ride from there. One bus has no seat in the front. It is the one that is supposed to be put down when the wheelchairs aren't using it. The seat is missing!

1.37 Tourism in Mobility Planning Efforts

Thank you to all those who provided comments regarding synergies between tourism and transportation. As part of our outreach for Beyond Mobility, MassDOT staff met with staff from the Massachusetts Office of Travel and Tourism. Although not explicitly stated in the Beyond Mobility plan, efforts to further improve collaboration with this office to connect transportation assets to tourist destinations is something MassDOT will consider for future work.

Table 37 Comments on Tourism in Mobility Planning Efforts

Comment Number	Comment
1	I was also surprised to see no mention of mobility efforts related to tourism. Tourism is an important and growing part of the North Central MA economy. The region is rich in historical, cultural and natural resources. Organizations supporting these resources are looking for ways to attract visitors. Many of our local communities as well as the North Central Chamber of Commerce have included tourism as part of their Master Plans and Economic Development Work. As we plan for 2050, we need to plan for supporting tourists with mobility options. This includes day tourists from other parts of the Commonwealth as well as longer term visits from

Comment Number	Comment
	tourists to the Commonwealth from other states and countries. The Commonwealth and others have made significant investments in preserving land and water resources in our North Central MA region and have plans to do more to protect our biological diversity and naturally sequester carbon. Most of these natural treasures are inaccessible to those without a private vehicle. This leaves those without vehicles no access to these common lands and the health benefits outdoor recreation provides. This recent article in Northern Woodlands summarizes a partnership in New Hampshire that provides urban residents access (transportation) to nearby outdoor spaces. (https://northernwoodlands.org/articles/article/transit-trails)

1.38 Addressing All Statewide Transportation Facilities

Thank you to all those who provided comments on improving transportation facilities. MassDOT views all transportation facilities as complementary to each other. In Beyond Mobility specifically, Action Items SAI3.4 (Prioritizing maintenance activities) and RSAI1.6 (UAS for disaster assessment) make reference to maintaining and protecting all transportation facilities in the Commonwealth. MassDOT will focus on encompassing all transportation facilities.

Table 38 Comments on Addressing All Statewide Transportation Facilities

Comment Number	Comment
1	We request consideration of adding a section or separate addendum addressing each asset of the statewide transportation system – highway, transit, active transportation, freight, aviation, ferry, and parking facilities – with a brief description of existing conditions, identified needs, relationship with the Priority Areas, and investment strategies. A discussion of each asset in this format would be helpful for regional agencies to better understand how regional and statewide priorities may align or conflict. This would also help the public understand the array of statewide transportation assets and associated management strategies. Understanding how the Priority Areas impact these assets would help the region develop more specific comments.

1.39 Affordability

Thank you to all those who provided comments on ensuring the transportation system is affordable. MassDOT views affordable transportation options as crucial to a well-functioning system for users. In Beyond Mobility specifically, Action Items TEAI1.2 (Fare-free transit options) and TEAI1.1 (Fare program results) make reference to affordable fare implementation in the Commonwealth. MassDOT will continue to strategize on fare policy to ensure an affordable transportation system for all.

Table 39 Comments on Affordability

Comment Number	Comment
1	I have disabilities but I get around independently. I would like more busses on Fridays. I would love on demand transportation that I could afford to pay,
2	We support the inclusion of Complete Streets, transit-oriented development, and multi-modal transportation action items. We request consideration of including Affordability as a Priority Area with fare free transit, reduced reliance on the automobile, and other initiatives that would reduce the burden of transportation costs and also contribute to the vision for a cleaner transportation system.

1.40 Ferry Operations and Aviation

Thank you to all those who provided comments on highlighting ferry and aviation as important modes of transportation. With respect to comments on further exploring improvements to ferry operations, Action Item DCAI4.3, "Expanded water transportation options," notes that "MassDOT and the MBTA will coordinate to expand water transportation options. This expansion of water transportation service will be informed by a Water Transportation Plan and emphasize connections from waterfront communities that lack convenient public transportation service to employment centers and other critical destinations."

With respect to Advanced Air Mobility, Action Item RAI3.2, "Multimodal freight movement," notes that "MassDOT will continue to explore and support investments in innovative multimodal freight movement opportunities like Advanced Air Mobility (AAM) that may improve reliability of freight travel and reduce the negative externalities of existing transportation systems."

Table 40 Comments on Ferry Operations and Aviation

Comment Number	Comment
1	We request consideration of including a discussion of ferry operations and aviation assets. The Nantucket region has various priorities related to aviation and ferry operations – affordable travel between the mainland and guaranteed year-round access to the Steamship Authority for residents. These assets are vital to ensuring the island region has access to the mainland as there are no bridges or tunnels connecting to the mainland. The Plan is silent on policy and investment for both ferry operations and aviation facilities. This discussion should also include emerging technologies, such as the emerging development of aircraft electrification and deployment of Advance Air Mobility (Unmanned Aerial Systems, Electric Vertical Takeoff and Landing (eVTOL), etc.). This technology provides an untapped potential to regain decadal losses in Commuter Air Taxi operations and enplanements. Massachusetts is currently one of five locations chosen by NASA to participate in Advanced Air Mobility Community Planning and Integration Partnership Opportunity. Including this in the Plan will help ensure participation in development of best practices for early community demonstrations (such as the demonstration currently planned on Nantucket), policy solutions, and initial operations of eVTOL aircraft, which would operate essentially as Uber/Lyft-in-the-air.

1.41 Freight

Thank you to all those who provided comments on highlighting the importance of freight transportation. MassDOT views freight transportation as a mode that is critical to the nexus of transporting goods and keeping the economy moving forward. In Beyond Mobility specifically, Action Items SAI2.4 (Develop Capital Freight Program), RAI3.2 (Multimodal freight movement), SCTAI1.3 (Freight greenhouse gas emissions), SCTAI1.4 (Equity in freight projects), and RSAI1.7 (Freight system assets) all make reference to policy and program changes to improve freight as a mode of transportation in the Commonwealth. MassDOT will be implementing these freight changes with a funding driven approach.

Table 41 Comments on Freight

Comment Number	Comment
1	We request consideration of including a discussion of freight assets, including truck, rail, ports and waterways, and air cargo. The NP&EDC has previously provided comments on MassDOT's recent Freight Plan. The strategies for improving movement of goods, such as expanded truck parking, was difficult to find in the Plan's Reliability section, and could have also been included in the Safety section. Organizing priorities by the Freight assets would have allowed a better understanding of conditions, identified issues and opportunities, and policy and investment priorities.
2	Opportunities to shift freight from road to rail were seldom mentioned. Even relatively small modal shifts to rail would improve safety and potentially significantly reduce highway congestion.

1.42 Performance Measures

Thank you to all those who provided comments regarding performance measures. We will share these performance measure recommendations with the Office of Performance Management and Innovation for consideration as part of MassDOT's annual Tracker report.

Table 42 Comments on Performance Measures

Comment Number	Comment
1	MassDOT should ensure 75% of residents and jobs are within a ¾ mile (15-minute) walk of frequent transit service by 2030, increasing to 90% by 2050. We need a bold vision for comprehensive statewide transit that includes the Regional Transit Authorities (RTAs) and local mobility. Commendably, Beyond Mobility does include plans to increase statewide transit service. However, this increase is incredibly narrow in scope – providing increased funds to Regional Transportation Agencies (RTAs) for increased weekend bus service is an acceptable short-term goal but not a visionary long-term one. Promoting transit as a real alternative to the private car will be difficult if service on many routes continues to show up less than once an hour or stops running in the early evening. Our neighbors in Rhode Island have committed themselves to ensuring that 50% of their residents (including 71.6% of low-income households) are within half a mile of transit service that arrives at least every 15 minutes by 2040, including nighttime service. In the final draft of Beyond Mobility, Massachusetts should commit to a service expansion plan that is even more ambitious than Rhode Islands'. This plan should also include a permanent funding source for the MBTA and a rolling program of bus infrastructure design and construction that includes the RTAs.
2	Destination Connectivity performance measures: It is a mistake to highlight only disparities between white and non-white residents. Performance measures should target positive impact on an inclusive group of people reliant on public transit (representing all environmental justice groups). Specifically disabled resident needs should be highlighted in measuring equity.
3	Ensure 75% of residents and jobs are within a ¼ mile (5-minute) walk of separated bicycle lanes and paths connecting nearby businesses and residential areas by 2030, increasing to 90% by 2050. People of all ages and abilities should have safe routes to school, work, grocery stores, businesses, and recreation. This will expand access and promote active transportation, improve the health of communities, and support transit-oriented development statewide. MassDOT should increase amenities (benches, countdown clocks, water fountains, restrooms) available to transit riders, bicyclists, and pedestrians – whether on MassDOT property or in collaboration with municipalities, transit providers, or peer agencies.
4	Page 124, Measures for Destination Connectivity do not capture progress toward meeting needs highlighted in Chapter 4. Block groups by racial categories do not capture overall availability of rides for non-drivers. Low-income and disabled riders have distinct priorities that are not measured. 1. % of low-income residents living in geography outside public fixed route (outside Â¾ mile)

Comment Number	Comment
	transit, without access to public demand-response transit for their necessary employment and medical destinations. 2. % of disabled residents living in geography outside public fixed route (outside Â¾ mile) transit, without access to public demand-response transit for their necessary employment and medical destinations.
5	Row 73 - I'd suggest adding "parking spaces percapita" to the list of metrics that MassDOT tracks. This may be a useful metric for tracking how car dependence changes over time.

1.43 Other

During the Beyond Mobility comment period, MassDOT heard several pieces of feedback that were about specific locations or were items of personal interest but not related to specific plan components. Comments referring to specific locations or personal concerns have been referred to the appropriate MassDOT Division or Highway District office for review.

Table 43 Comments on Other Topics

Comment Number	Comment
1	"the bids for the new MBTA Bus Maintenance Facility in Quincy came in at nearly $80 million over the engineer's estimate of $280 million in the Spring of 2022, during the height of inflation and economic uncertainty." Go back to catenary busses/ trackless trolleys. Removing them has been a downgrade ecologically and service wise.
2	I think the Plan is very good - well thought out and clearly presentted. I agree with the priority areas, vision and value statements, problem statements and action items - especially Supporting Clean Transportation and Resiliency. Thanks for all the hard work that went into preparing thius.
3	I have been here so many times and I am not able to get appt on a walk in day I have a great job I need unexpired ziD n ii am pleading w your office to send me an unexpired mass ID card at 140 Clarendon st unit 606 Boston MA 02116
4	The hearing scheduled needs have an option as to if it's an an emergency I'm going to lose my car and job and can't get my son to where he needs to go because the rmv can't make a phone all to take my money for My registration for over a month while my car rots in a tow lot collecting 40 dollars a day
5	Where do you Marxist-Socialist people get your ideas. This is an expensive state so this effects people of color more than others? I guess if you are a border jumper and don't have many skills or speak English you go to lower rent places, such as Lynn, Chelsea, Fall River or Fitchburg. Is that racist? It wasn't when the Irish, French, Poles and Italians came over legally. Now it is and they need more money and assistance then their predecessors ever thought of getting because they could not become a public charge. Oh... life is unfair. Learn to speak English, get an education and working hard is a capitalist illusion. DEI is not for transportation issues.... it is geography that determines most of transportation for the average resident of this state. Try waiting for the bus in most middle class suburbs.....nothing much there and they don't want to pay for them. The MBTA is a disaster and their DEI hiring is a major part it. Cut my taxes, stop supporting illegals and use my money for replacing bridges, instead of supporting border jumping economic migrants. You assholes can't even fill in the spring crop of potholes!
6	Please add more lanes to Route 3, 53, 3A and 93 to ease the daily bottlenecks for travel from the South Shore to Boston. Please erect a sound barrier wall in Norwell on Route 3 as the roadway was significantly raised when a bridge was replaced over High St.

Comment Number	Comment
7	Is this a plan? I don't see a plan here. I see three possible outcome scenarios for a number of issues, with no sense of which is more likely to happen, or what solutions would suffice for several outcomes. It's not a plan, it's an obfuscation. Prioritize plan based on transit users needs, and make clear decisions.
8	there is something with this site when you need to set up an appointment with DMV
9	I no longer have my driver's license. Hence, I am at the mercy of others and/or learning other ways to do online Hence, my need/reason to turn to MASS Gov on line. Upon many failed attempts and much frustration I finally completed the application form(s) EXCEPT for the last requirement.... an appearance at the local RGM office (Easthampton) which is about 8 miles from where I live, and I have no car and no license. I will be 90 yrs. old on my next birthday and in dire need of acceptable identification, Transportation is a/the problem for me. My question is--is there another way (for people my age) to complete the process online or email attachment?.
10	The Final Draft plan looks good. Didn't see anything objectionable, and I support a lot of the proposals (e.g. reducing single-occupancy miles, exploring automated enforcement for red lights and speeding, and so on)
11	I am really excited about this project.Cape Cod Commission is proud to be a partner with MassDOT for its long-term vision to improve the Commonwealth's multimodal transportation network. We admire the comprehensive and ambitious goals set forth in the Beyond Mobility Plan to improve the user experience for all modes, reduce fatalities and serious injuries, support clean transportation, build climate resilient infrastructure and prioritize transit investments. The Beyond Mobility Plan lays the groundwork for much-needed investments improvements across all regions with a strong focus in our Environmental Justice communities, who have been disproportionally affected. The Cape Cod region is facing many of the challenges detailed in the plan, from aging bridge infrastructure, low lying roads, lack of multimodal accommodations to support transit usage and high crash roadways and intersections. We look forward to working alongside MassDOT towards implementation of this long-term plan.
12	I would like to see more emphasis on the role of municipalities in improving bus service. Putting a bus in slow and congested traffic makes for slow and unreliable bus service. Dedicated bus lanes and boarding islands can make significant improvements to reliability -- if the municipalities are willing to allow them. This likely means having difficult conversations about parking and how roadways are "budgeted" to accommodate different modes of travel. As a matter of policy, I feel that communities that are willing to provide bus infrastructure should be the first in line for service improvements.
13	I'd suggest adding "parking spaces percapita" to the list of metrics that MassDOT tracks. This may be a useful metric for tracking how car dependence changes over time.
14	Change "¯Waltham' as a control city signed on 95/128 up in Peabody by the route 1 interchange. Waltham is a fine city, and is signed for US20, and the close proximity to the pike, but it is secondary signage worthy. Providence RI should be signed from that junction to avoid through traffic on 93 in the city. Providence is signed from over 80 miles up in Georgetown but gets no mention until passing route 2 when you're already in Waltham. Waltham being signed on 95S from 93 is good and makes sense since you'd be coming from Boston making providence a bit of a stretch.